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# ***JPRS Report***

# **Science & Technology**

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***USSR: Science &  
Technology Policy***

9 JULY 1987

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SCIENCE & TECHNOLOGY  
USSR: SCIENCE & TECHNOLOGY POLICY

## CONTENTS

## ORGANIZATION, PLANNING, COORDINATION

Accelerating Introduction of New Generations of Equipment (O. V. Yaremenko; STANDARTY I KACHESTVO, No 8, Aug 86).....	1
Scientific Research on Long-Range Standardization (G. N. Bobrovnikov, A. I. Klebanov; STANDARTY I KACHESTVO, No 4, Apr 86).....	15
Measure To Improve Product Quality Analyzed (G. D. Kolmogorov; STANDARTY I KACHESTVO, No 9, Sep 86).	19

## FACILITIES, MANPOWER

Reader Responses to Articles on Institute Closings (IZVESTIYA, 25 Aug 86).....	32
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## TRAINING, EDUCATION

Improvement of Training, Certification of Scientists (Viktor Grigoryevich Kirillov-Ugryumov Interview; IZVESTIYA, 30 Aug 86).....	36
---	----

Far Eastern Scientific Center Operations Reviewed (V. Ilichev; PRAVDA, 16 Oct 86).....	41
PATENTS, INVENTIONS	
Documentation, Evaluation, Introduction of Inventions (V. Skomorokhov, G. Gordiyenko; PRAVDA, 22 Oct 86).....	46
INTERNATIONAL S&T RELATIONS	
CEMA Scientific, Technical Information Systems (L. Chausov; PRAVDA, 13 Oct 86).....	50
REGIONAL ISSUES	
Inefficiency of Kazakh Academy of Sciences Institutes (T. Yesilbayev, A. Petrushov; KAZAKHSTANSKAYA PRAVDA, 21 Aug 86).....	53
CONFERENCES, EXPOSITIONS	
Role of Social Scientists in Socioeconomic Development (PRAVDA UKRAINY, 11 Sep 86).....	57

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## ORGANIZATION, PLANNING AND COORDINATION

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### ACCELERATING INTRODUCTION OF NEW GENERATIONS OF EQUIPMENT

Moscow STANDARTY I KACHESTVO in Russian No 8, Aug 86 pp 24-28

[Article by Candidate of Technical Sciences O.V. Yaremenko, the All-Union Scientific Research Institute of Standards (VNIIS), under the rubric "Standards: Technical Progress, Economy, Efficiency": "Promote the Acceleration of the Introduction of New Generations of Equipment (The Role of Organizations and Enterprises in the Development and Placement of Products Into Production)"; capitalized passages printed in boldface; passages within slantlines printed in italics]

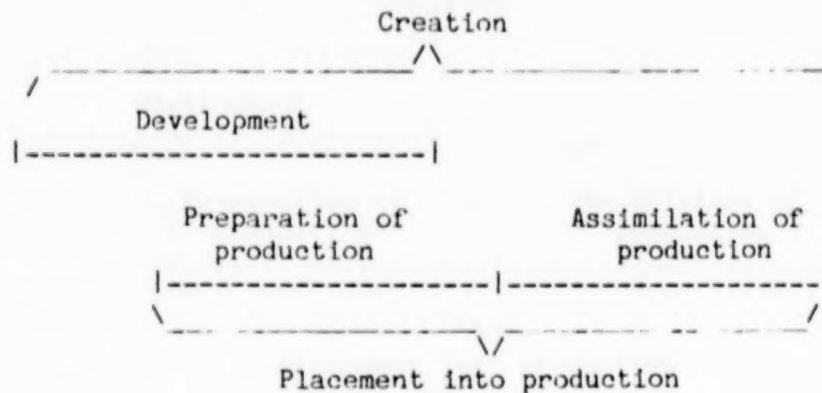
[Text] One of the basic tasks of the economic and social development of the USSR for the period to 2000 consists in the fundamental increase of the technical level and quality of the products being produced and the assurance of the creation and assimilation of new generations of equipment. This problem should be solved, first of all, by the organizations participating in the development of products and their placement into production.

Judging from the many appeals that have been received by Gosstandart [State Committee for Standards] (in particular, by VNIIS), some clarifications of the role and content of the work of various organizations in the creation of new products with allowance made for the provisions of the Basic Directions of USSR Economic and Social Development for 1986-1990 and the Period to 2000 are necessary. As stated in [1], the responsibility of organizations and enterprises for the conformity of the created products to the world level is specified by the 14 January 1986 decree of the USSR Council of Ministers.

PARTICIPANTS IN THE CREATION OF PRODUCTS. (Footnote 1) (The relationship between the terms "product development," "the creation of products," and others, which are used in the article, is shown in the figure) In the general case, the following parties take part in the creation of products:

- the client or principal user;
- the main developer;
- the codeveloper;
- the main organization for a type of product;

- the testing organization;
- interested specialized organizations;
- the manufacturer.



The /client/ or /principal user/ of development may be a ministry (department) or a association, enterprise or organization (hereafter, structural link), which is subordinate to it. The initiative of development belongs to the client. If development is carried out on the initiative of the developer, it deals not with the client, but with the principal user. The client may be the direct and only user of the product. In such a case, a contract is concluded between them and the developer without any consultations with higher organs.

If a ministry acts as the client (principal user), all organizational methods work should all the same be performed by the /main organization of the user/ sector, and this organization must perform the functions of and bear the responsibility as the client or principal user in accordance with prevailing legislation. In a machine building ministry a main scientific research institute can be such an organization.

If the product being developed is to be supplied to several users, the client (principal user) has the obligation to take their demands into account.

Only a structural link (but not a ministry), which can incorporate design and research subdivisions, pilot enterprises, testing grounds and other services that are necessary for the elaboration of documentation and prototypes submitted to the acceptance commission, can be the /developer/ of documents.

If the developer does not have a sufficient production or experimental base, they may enlist the aid of the manufacturer of the prototype or the future series-produced product or of other structural links. Their interrelations at the development stage can be regulated in a contract and are not subject to any checks on the part of a state inspectorate with regard to the drawing up of the documentation, the work procedure, and so on.

If several structural links participate in development, a /main developer/ responsible for its end result is appointed.

If there is a main developer, there will always be one or several /codevelopers/. Among them, first of all, are the structural links that develop component parts of the final product (materials, semifinished products, components). But in the general case, the codeveloper can be a structural link--the designer of the structural part, the developer of technological processes, an organization that specializes in analyses, investigation tests, and so on.

The main developer combines the functions of developer of the final product and client vis-a-vis the codevelopers. But the interrelations between the main developer and the codevelopers differ from interrelations between client and developer: regardless of the departmental affiliation of the main developer and the codevelopers, development is carried out in accordance with a common technical assignment, moreover, special technical assignments are approved by the main developer.

The term /"main organization for a type of product"/ was introduced by the 14 January 1986 decree of the USSR Council of Ministers in place of the previously used term "leading organization for a type of product/," that is, this is the organization that implements a unified technical policy vis-a-vis the groups of homogeneous products, which have been assigned to it.

What are the relations between main organizations for types of products and main and base organizations for the standardization of certain types of products, which are approved by Gosstandart?

An all-union list of main organizations for types of products does not exist, therefore, it is advisable that main and base organizations for standardization would perform their functions.

The main organization for a type of product can itself perform the functions of a developer. In such a case, according to prevailing legislation, the organization appointed by the GKNT [State Committee for Science and Technology] should issue a conclusion on the technical assignment for development. In order not to waste time on searching for such an organization for every specific development, the main organization for types of products can send a request to the GKNT on the appointment of a /permanent organization which issues conclusions on development within a group of homogeneous products/.

The main organization for state testing of the most important types of products or a departmental testing organization can be the /testing organization/.

The demands on these organizations, their rights and duties are specified in documents of the state testing system. However, ministries need to ensure that, first, all the products assigned to them would be distributed among testing organizations and, second, there would be no cases of duplication of

the tests within a region of identical products by different testing organizations.

An /interested specialized organization/ is a state inspection organ (for example, Gosgortekhnadzor [State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision], Gosavtoinspektsiya [State Motor Vehicle Inspection Administration]), trade union organs, and others. Such organizations take part (as coordinators) in the development of the technical assignment, if the developer considers the existing norms, demands and rules pertaining to questions belonging to their jurisdiction to be insufficient for carrying on the work.

The manufacturer is a PO [production association], NPO [scientific production association] or enterprise that manufactures the product that will be supplied to the user. If the participation of a given enterprise in the creation of a product is confined to the production of only prototypes, it is considered not the manufacturer of the product, but a participant in its development--a producer of prototypes.

Let us examine the role and tasks of the above-enumerated structural links in the fulfillment of individual paragraphs of the Basic Directions of USSR Economic and Social Development for 1986-1990 and the Period to 2000. (These paragraphs are rendered in boldface. The definitions of certain terms are presented at the end of the article.)

**1. ...TO EXPAND THE USE OF ADVANCED BASIC TECHNOLOGIES BY 1.5- TO 2-FOLD DURING THE 12TH FIVE-YEAR PLAN.**

**TO ACCELERATE THE DEVELOPMENT AND PLACEMENT INTO PRODUCTION OF NEW GENERATIONS OF HIGHLY EFFECTIVE EQUIPMENT. TO MAKE THE TRANSITION TO THE OUTPUT OF SYSTEMS AND COMPLEXES OF PRODUCTION MACHINERY.**

The basic role in the realization of this paragraph belongs to the client (principal user) of machines and machinery for both the machine building and non-machine building sectors.

So that the machinery being developed would not be inferior to or would surpass the world level, the main organization of the user sector should solve a number of problems in the NIR [research] process:

- a. Based on the study of world experience, it should compare alternative technological processes and choose the most advanced process--the basic technology;
- b. It should select the main parameters of the technological process and on the basis of the analysis of need should establish the dimensional series of technological processes;
- c. It should divide the base technological process into technological operations that are performed by individual machines and units of machinery and on the basis of the dimensional series of the technological process of the technological process, with allowance made for the analysis of need, should

establish the optimal typesize series of technological operations, which correspond to the typesize series of the ordered machinery.

d. In accordance with [2] it should analyze the levels of existence of the ordered machinery and in departmental documents should regulate the parameters of the conditions of existence and the demands on them. These data, together with the results of the analysis of the world level of the ordered items, will subsequently make it possible to formulate the client's demands on the product in accordance with GOST [all-union state standard] 15.001-73.

In those instances, when one developer will carry out develop, it can participate in the indicated NIR together with and simultaneously with the client.

2. TO UTILIZE MORE FULLY WHEN DEVELOPING NEW EQUIPMENT AND TECHNOLOGY THE POTENTIALS OF MATERIALS WITH PRESET PROPERTIES, ESPECIALLY ADVANCED CONSTRUCTION MATERIALS, INCLUDING SYNTHETIC, COMPOSITE, ULTRAPURE, AND OTHER MATERIALS, WHICH MAKE CONDITIONS FOR A LARGE ECONOMIC IMPACT IN THE NATIONAL ECONOMY.

In order to fulfill this paragraph, it is necessary:

--to create component parts (materials, semifinished products, and components) for general industrial and intersectorial use in a sufficient mix and quantity;

--to provide developers of items with information about their properties and range;

--to envisage their use in the final product.

The main organizations for the groups of component parts, which are attached to them, should accomplish the first two tasks.

The third task is accomplished by the main developer, who prior to the drafting of the technical assignment is obligated:

a) to identify the component parts, the low quality of which lowers the technical level of the final product;

b) to ascertain the possibility of obtaining component parts of the required quality and in the necessary volume;

c) in the absence of such, to formulate demands on them and to enlist the main organizations, to which the necessary component parts are assigned, as a codeveloper;

d) in the technical assignment for the development of the final product in conformity with GOST 15.001-73 such demands which are practicable only if high-quality component parts are used.

If differences arise between the main development and the codeveloper on the values of the technical and economic indicators of the component parts, the prevailing legislation provides for the compilation of a report on the differences, which is submitted to the ministry (department). If it is not possible to settle the differences at the departmental level, the ministry (department) refers it to the GKNT for the making of a decision within a 30-day period.

A feasibility study confirming the possibility or impossibility of attaining the required values of the quality indicators should be appended to the report on the differences.

3. TO DEVELOP ON THE BASIS OF PROMISING SCIENTIFIC AND TECHNICAL ADVANCES THE USE OF TYPE DESIGNS OF TECHNOLOGIES AND TO INTENSIFY SECTORIAL AND INTERSECTORIAL STANDARDIZATION OF MACHINES, ASSEMBLIES, AND PARTS.

This paragraph predetermines the solution of two interconnected problems, one of which rests with the client and the other with main organizations, with the direct participation of Gosstandart and the GKNT.

The problem of the /use of type designs of technology/ consists in the development of a standard technology by the client, the structure and majority of the elements of which are intended for repetition in other homogeneous technologies.

Here, elements of technology are understood as operations, transitions and units of production machinery, while structure is understood as the interconnection of elements (the sequence of operations and transitions and the relative position of units of machinery).

For example, the client needs to create (or modernize) at various chemical combines (of different capacity, using different raw materials) production lines for the production of nitrogen fertilizers. The use of type designs makes it possible to solve the given problem most effectively: not to create for each chemical combine its own technology, but to develop in detail a technology for a specific, most typical combine, and, having accepted it as the standard technology, to limit oneself only to its "attachment" to local conditions. The use of type designs of technology thus enables the client to standardize the bulk of the ordered machinery, since most of the machines, apparatus, and other items will be intended for use at many chemical combines.

The mechanism of the intensification of sectorial and intersectorial product standardization is specified by GOST 26197-84-GOST 26199-84.

The /intersectorial standardization of machines and machinery that are being created/ depends directly on the quality and degree of the client's study of the problem of the establishment of basic technologies and the use of type designs in them.

The main organization for the type of product carries out the /sectorial standardization of the machines and machinery that are being created/ by

establishing optimal typesize series and promising ranges within assigned groups of similar products.

The /intersectorial standardization of component parts of dissimilar groups of products/ is a much more complex matter. In this connection it should be emphasized that the main organizations (in the person of the general and chief designers), to which groups of similar final products are assigned, cannot be responsible for the intersectorial standardization of component parts of products. The general designer, for example, of agricultural combines cannot and should not see to it that the springs, joints, plain bearings, and other component parts, which were used in a combine, would be used, say, in textile or construction machines.

This problem can be solved only by producing high-quality intersectorial component parts at highly specialized works (that is, the creation of an element base is necessary).

In precisely this way it will be possible to ensure the standardization of component parts for intersectorial use.

Unfortunately, in domestic machine building for many years instead of developing the element base it was recommended to the designer in its development to borrow a component part from another development.

The scientifically sound procedure for the intersectorial standardization of component parts is regulated by GOST 26198-84. It consists roughly in the following:

- a) in accordance with GOST 26197-84 and on the basis of the code of the All-Union Classifier of Industrial and Agricultural Products the main organizations for types of products make proposals in standardization programs on the intersectorial standardization of individual types of component parts;
- b) the Council of General (Chief) Designers attached to Gosstandart examines these proposals, along with analogous proposals of the client (principal user), and designates the main organization for each type of component parts in accordance with GOST 26198-84;
- c) the main organization for types of component parts for intersectorial use, which are attached to it, develops and places them into production according to GOST 15.001-73 and other documents of the system of the development and placement of products into production [3].

4. TO IMPROVE INVENTION, PATENT, AND LICENSE WORK. TO CREATE THE NECESSARY CONDITIONS FOR THE EARLIEST INTRODUCTION OF INVENTIONS AND EFFICIENCY PROPOSALS IN THE NATIONAL ECONOMY.

The named types of work in the creation of the product have extremely great importance as determinants of its technical level. They include patent research and invention.

/Patent research/ is one of the most important directions of work, first of all, of the main organizations for groups of similar products, which are assigned to them, and the main organizations of clients (principal users) of products. It should be conducted in accordance with GOST 15.011-82.

It is not mandatory for the developer himself when fulfilling custom development to conduct patent research, but he is obliged to become familiar with reports on patent research in the main organization for a type of product, moreover, the immediate performers of the development should do this: familiarization with promising technical decisions is a good basis for invention.

The development of /invention/ and the earliest possible introduction of inventions in the national economy depend, first, on the organization of this work at scientific research institutes, design bureaus, and the enterprise, and, second, on the existence of an experimental base: a pilot works, test benches.

5. THE VITAL TASK IS TO STRENGTHEN THE TIES BETWEEN SCIENCE AND PRODUCTION, TO CREATE SUCH ORGANIZATIONAL FORMS OF THE INTEGRATION OF SCIENCE, TECHNOLOGY, AND PRODUCTION THAT MAKE IT POSSIBLE TO ENSURE THE EFFICIENT AND RAPID PASSAGE OF SCIENTIFIC IDEAS FROM INCEPTION TO BROAD APPLICATION IN PRACTICE.

One of the factors in realizing this paragraph is the assurance of the coordination of long-range research, which is usually conducted by main organizations vis-a-vis groups of similar products [4], with specific developments.

The initiative in the given instance must come from industry: the main organization for a type of product or the main organization of the user sector can formulate problems that require basic research and through their ministry can submit them to the GKNT or the USSR Academy of Sciences with an indication of the demands on the final result. So far such requests have practically not been received from the sectors.

6. TO SHORTEN TO ONE-FOURTH TO ONE-THIRD THE TIME OF THE DEVELOPMENT AND ASSIMILATION OF NEW EQUIPMENT. TO SEE TO IT THAT THE TYPES OF EQUIPMENT, WHICH ARE BEING NEWLY ASSIMILATED, IN CAPACITY AND RELIABILITY WOULD SURPASS BY 1.5- TO 2-FOLD THE ANALOGOUS PRODUCTS THAT ARE BEING PRODUCED.

This paragraph is the end result, to which we should direct attention when improving the system of the development and placement of products into production during the 12th Five-Year Plan.

First a word about the time. One should understand the time of the development and assimilation of a new series-produced product as the calendar period from the beginning of development, which was established by the plan, supply order, or contract, to the moment of assimilation (formally up to the point where the product is awarded the letter A) [4].

Let us examine the factors that drag out the time of the creation of a product.

a. /The unjustified lengthening of the planned time of the creation of a product/. Up until now, the time of development and the preparation of production (including assimilation) has been set without any scientific analysis of the length of the stages. Of course, the developer in most cases tries to provide himself with a time reserve. Such a practice no longer satisfies the increased requirements of the acceleration of scientific and technical progress. Careful analysis of stages of the work is required in the coordination of deadlines between the client and the developer.

The planned period of the creation of a product should be coordinated with standard period of the updating of products, which is set by the main organizations. The shortening of this time will objectively entails the shortening of the time of the creation of products.

b. /The lack of a material interest of the developer in shortening the time/. In addition to creating the general economic mechanism for stimulating the acceleration of development, when concluding a contract for development the client is entitled to make provision for paying an additional reward to the developer for the early fulfillment of stages and the work as a whole.

c. /The lack of raw materials, materials, semifinished products, and components of the necessary quality and in the necessary quantity/. This is one of the basic factors, which leads to the dragging out of the time of the creation of products.

The ways of overcoming this difficulty were described in paragraph 2.

d. /The insufficient development of the pilot production base/. The careful processing of component parts and final items on benches is one of the progressive trends in the development of machine building. The absence or insufficient capacity of the developer's experimental base, first, does not make it possible at the stage of development to machine individual machine assemblies, and, second, makes it incumbent to carry over the tests to operating conditions, which is tens of times more costly and involves a considerable loss of time.

The development of the experimental base is a most important task of main organizations for types of products and of testing organizations. The capital investments, which are released for this, pay for themselves with interest due to the shortening of the time of the creation and the improvement of the quality of products.

e. /The late enlistment of the manufacturer in the preparation of production/. In this case, when the developer and manufacturer are different structural links, especially if their department subordination is different, the manufacturer is most often given the full set of documentation all at once, after which he begins the preparation of production.

Meanwhile, it is possible to shorten significantly the time of the placement of a product into production, if development and the preparation of production are carried out simultaneously. For this it is necessary, without waiting for

the acceptance commission, to turn over to the manufacturer the documentation when it is ready, as is specified in prevailing legislation [1]. The formation of PO's and NPO's promotes the solution of this problem. The procedure for turning documents as they are ready should be established in the enterprise standard or in the sectorial standard.

Now a word about increasing the productivity and the reliability of the product. Does this paragraph mean that when updating a specific product it is always necessary to require a 1.5- to 2-fold increase of the productivity and reliability? Of course not. The main organization for a type of products depending on the peculiarities of the group of similar products should specify to which indicators of productivity and reliability the products should correspond at the given stage and should ensure a 1.5- to 2-fold increase in the given indicators in standards with long-range demands. What is more, productivity can be expressed not only in the increase, for example, of the unit power of a turbine or pump, but also in the specific indicators of the effect vis-a-vis costs, the consumption of fuel, the materials-output ratio, and others. What is more, this assignment of the Basic Directions applies to the group of similar products, to which specific products that already have the optimal reliability belong, while the problem consists in "pulling up" other specific items to their level. A formal approach to the realization of this paragraph can lead to considerable losses. The formulation of criteria for group the products being developed with new ones is necessary.

7. TO WIDELY INTRODUCE FLEXIBLE ADJUSTABLE MACHINE SYSTEMS, COMPUTER-AIDED DESIGN SYSTEMS, AUTOMATIC LINES, MACHINES AND EQUIPMENT WITH BUILT-IN MICROPROCESSOR HARDWARE, MULTIPLE-OPERATION NC MACHINE TOOLS, AND ROBOTIC, ROTARY AND ROTARY-CONVEYER COMPLEXES. TO CHANGE OVER TO THE DELIVERY OF COMPLETE TECHNOLOGICAL SYSTEMS AND COMPLEXES OF MACHINES.

Technological organizations of machine building ministries act as the client in the development and placement of a given product into production.

The questions, which they should settled, were examined in paragraph 1. On the whole the organizational and technical supervision of the retooling of the sector can be assigned to the ministry's main technological organization.

Machine building enterprise designers can also take part in development (as codevelopers).

8. TO IMPROVE REPAIR WORK, TO ENSURE THE RELIABLE OPERATION OF MACHINES AND MACHINERY IN ALL SECTORS OF THE NATIONAL ECONOMY. TO DEVELOP THE FIRM REPAIR AND MAINTENANCE OF SOPHISTICATED, ESPECIALLY HIGH-PRECISION EQUIPMENT BY THE FORCES OF THE MANUFACTURERS....

Many aspects of this extremely urgent problem have not been resolved to date. Thus, so far it has not been possible to come to an agreement and to establish unequivocally who should draw up the repair documentation--the developer, the manufacturer, or the user.

Meanwhile, repair work should be based on the technology of basic production with the addition to it of specific repair operations. This means that the preparation of documents for basic production and repair work must not be separated. And the main organizations for a type of product must not bear responsibility for the solution of the repair problem as a whole. They should elaborate and ensure the fulfillment of measures that take the basic features of repair work into account. Among the basic measures it is possible to name:

- the organization of regional firm repair work or (if this is inadvisable) the organization of repair work according to the sectorial principle;

- the supply of repair enterprises with sophisticated technological means and test equipment;

- the selection of a main repair enterprise, at which there is an experimental base for perfecting specific repair operations (if such a base does not exist, its establishment should be envisaged);

- the organization of supervision by the developer and (or) the manufacturer during repair;

- the gradual transfer of the repair work performed by the user to repair enterprises or the enlistment in on-site repair of repair specialists from repair enterprises (including firm enterprises);

- the assurance of the preparation of repair documentation by the developer with the enlistment (if necessary) of the manufacturer and (or) the main repair enterprise, and so forth.

9. TO EXPAND THE ITEM, PART, AND TECHNOLOGICAL SPECIALIZATION AND COOPERATION OF PRODUCTION... TO STRIVE FOR THE MAXIMUM STANDARDIZATION OF ASSEMBLIES AND PARTS. TO IMPLEMENT MEASURES ON THE CREATION OF MACHINES, EQUIPMENT AND INSTRUMENTS BASED ON STANDARDIZED MODULAR AND BASE COMPONENTS.

Product standardization is always primary with respect to the specialization of production since, the limited product list resulting from standardization is the basic feature of production specialization.

Standardization is activity that is directly associated with the first two stages of the life cycle of the product, therefore, it is carried out by the main organization for a type of product and by the developer according to the procedure described in paragraph 3. Nevertheless, the specialization of production goes beyond the framework of the direct activity of the participants in the creation of the product, since the object of production specialization is not the product, but the production links--sections, shops, plants, and so on. The relationship between these two types of activity is defined by GOST 26197-84.

The creation of machinery and instruments on the basis of standardized modular and base components requires of the main organizations a new approach, in case of which initially standardized sets of components, and then final items, which are obtained by unitization, are developed and assimilated in

production.

Thorough and comprehensive research on the formation of technology according to the modular principle is necessary for the realization of this paragraph of the Basic Directions.

10. IN MACHINE BUILDING MINISTRIES TO SIGNIFICANTLY INCREASE THE PRODUCTION OF SPECIAL PRODUCTION EQUIPMENT FOR THEIR OWN NEEDS.

The organizational and procedural role in the realization of this paragraph of the Basic Directions can be assigned, for example, to the ministry's main technological organization.

To this end, it needs to:

--classify and ascertain the applicability of promising technological processes and means of their performance in the output of products;

--ascertain the possibility and terms of the order for equipment "on the side" and the technological possibilities of its enterprises to produce the required equipment of a high technical level;

--designate developers and manufacturers of production equipment;

--together with the users of equipment, establish the technical demands on it and ensure the development of equipment through supply orders in accordance with established procedure.

In the development of production equipment for its own needs, it is obligatory to obtain the conclusion of the main organization for the type of product on the conformity of the development to the world level. In creating such equipment it is necessary to direct attention to the greatest degree to the possibilities of standardization, as is envisaged, in particular, by GOST 26199-84.

According to the Basic Directions, in every sector programs of the retooling and modernization of production based on modern equipment and advanced technology should be formulated and implemented. These programs will include work on paragraphs 1, 7, 9, 10 and in part on paragraphs 3 and 4. Based on the analysis of the work on these paragraphs, one can conclude the feasibility of "symmetry" in the organization of work on the creation of products by the user and supply parties: if the unified technical policy of the former is implemented by the main organization within the group of similar products, the latter's unified technical policy on the development of processes and means of production should be implemented by one organization--a main technological institute of a ministry (department).

#### DEFINITIONS AND EXPLANATIONS OF CERTAIN TERMS ENCOUNTERED IN THE ARTICLE

BASE TECHNOLOGY (technological process)--the basic aggregate of techniques and methods, which is intended for repetition in concrete aggregates of techniques

and methods of obtaining, manufacturing or processing raw materials, materials, semifinished products, or items.

A base technology can be characterized by the process, means, or phenomenon, on which it is based, for example, laser processing of materials, die casting, explosion welding.

SYSTEM OF MACHINES--a chain of heterogeneous, complementary machines that are intended for the performance of a given technological process, for example, for crop harvesting.

The system of machines is a special case of a system of equipment, which, in addition to machines, includes devices, instruments, structures, and so forth.

COMPLEX OF TECHNOLOGICAL EQUIPMENT--the aggregate of several equipment systems having common elements (operations, transfers, means) and common control.

MAIN PARAMETER--the parameter which expresses to the greatest extent the effective impact that is created by an object (product or process).

BASIC PARAMETER--a parameter from among those established for expressing the quality of an object to a sufficient degree.

NEW PRODUCT--a specific product, the technical level of which corresponds to the best world level or exceeds it and which satisfies demands that are established by directives for the planned period.

NEW EQUIPMENT--the aggregate of new techniques and new means of labor (products, structures, supply lines, and so forth), which are created for the purpose of performing production processes and serving society's nonproductive needs. In a narrow sense, new technology refers to its individual components, in particular, to new products.

STANDARDIZATION--the reduction of the diversity of elements relative to the diversity of the systems in which they are applied. It is possible, for example, to view a system of machines, a product or a technological process as a system and accordingly to view a machine, component part or technical solution of a product, an operation or the changeover of a technological process as an element.

USE OF TYPE DESIGNS IN TECHNOLOGY--the creation of technology, the sequence and the majority of techniques and methods (operations and changeovers) of which are intended for repetition in other similar technologies. The use of type designs is a type of standardization.

SOPHISTICATED MACHINERY--a final item, the adjustment, maintenance and (or) repair of which is performed by personnel trained for this using special means (that is, tools not included in the kit of spare parts, accessories, instruments and equipment).

ESPECIALLY HIGH-PRECISION EQUIPMENT--an item of the highest precision category, which is grouped with a type of items for which such classes are established (for example, an instrument, a machine tool, a dispenser).

STANDARDIZED MODULAR COMPONENT--an item that is complete as to design--a component part belonging to a standardized set, that is, to an aggregate of component parts which are intended for the creation of various kinds of final items through selection and various configurations (for example, a set of adjustable accessories).

STANDARDIZED BASE COMPONENT--an item that is complete as to design--a component part intended for the creation of various final items by the connection to it of other component parts (for example, a tractor to which various mounted implements can be attached: the geared motor of a universal kitchen combine).

MACHINE BUILDING PRODUCTS--products that belong to the group of similar products, which is assigned to a machine building ministry, as well as machines and their component parts that are assigned to a non-machine building ministry.

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## SCIENTIFIC RESEARCH ON LONG-RANGE STANDARDIZATION

Moscow STANDARTY I KACHESTVO in Russian No 4, Apr 86 pp 10-11

[Article by Doctor of Technical Sciences G.N. Bobrovnikov and Candidate of Technical Sciences A.I. Klebanov, the Academy of the National Economy attached to the USSR Council of Ministers, under the rubric "Standards: Technical Progress, Economy, Efficiency. Problems, Theory, Methods of Standardization": "Development of Scientific Research in the Field of Long-Range Standardization"]

[Text] The evaluation of the role and the tasks of long-range standardization as a scientific methods activity is assuming great importance at the present stage of development of scientific and technical progress.

It is obvious that during the 12th Five-Year Plan and in the period to the year 2000 long-range standardization should ensure the normative regulation of activity in the sphere of physical production and consumption under the conditions of intensification, on the basis of the acceleration of scientific and technical progress. During this period the problems of radically improving the scientific methods level of the normative documentation being created should probably be solved.

The historical stages in the development of science and technology bear witness to the fact that any scientific activity begins with the systematization and then earns the right to be regarded as such "fully and completely" by means of the elaboration and substantiation of the criteria of necessity and sufficiency.

As applied to long-range standardization, this means the substantiation of a rational (that is, necessary and sufficient) number of state and sectorial standards that are being elaborated and brought up to date. This also pertains to the elaboration of standards of enterprises. It is precisely in the area of determining the rational (ideally speaking, the optimal) number of standards, or the basis of the elaboration of the criteria of necessity and sufficiency (with the aid of methods of systems theory, optimization theory, and others) that, in our opinion, the solution to the problem of further developing standardization as a type of scientific methods activity lies.

At the same time that the criteria of necessity and sufficiency are being worked out, for standardization the questions of creating the scientific methods foundations of unification should be settled in much the same way. The substantiation of the criteria of necessity and sufficiency in the area of unification should radically influence the assurance of the fullest satisfaction of the needs of the national economy and the population for industrial products of a specific assortment (products list). Determining the rational number of types (type sizes) and the items being developed and turned out, as well as a rational level of unification of the constituent elements (parts, assemblies, blocs, and others) should aim the developers and producers at achieving the optimal universality of new industrial products. This will ensure the saving of all kinds of material resources and socially necessary labor expenditures on their creation and utilization.

Until the end of the current century the standards containing long-range demands on new products, that is, the gradual growth in time of the indicators of consumer characteristics, should occupy the dominant position in the standard technical documentation. Such a major shift to long-range standards, which lead the present-day state of industrial production, stems from the possibilities of fully automating the processes of preparing information, and drafting, drawing up, and duplicating standard technical documentation.

It is probable that during the period when the national economy is being computerized, long-range standards not only should be given the form of machine-oriented documents, but also should be transferred as a whole to "paperless" carriers of information (magnetic tapes or disks), which provide for online output of the information contained in the standard technical documentation on display screens (terminals). This shift will be particularly effective with the widespread use of "personal computers" in the national economic practice. The originals of the standard technical documents being worked out can be stored in single copies on traditional carriers of information in the form of microfilms, microfiches, and, finally, a typed version.

In creating "paperless" advanced standard technical documentation the demands on the structure and form of presenting a document, which would ensure the optimality of the process for transmitting and receiving standardized data within the "human-computer terminal" system (in accordance with the ergonomic demands on an "operator-machine" system), should be scientifically sound.

In formulating the demands on the contents of standard technical documents during the 12th Five-Year Plan particular attention should be paid, first of all, to the establishment of a rational correlation between the standards with long-range demands on the product being developed and the recording standards. During the period to the year 2000 the center of gravity in scientific research should shift to the area of determining rational time periods for revising the long-range requirements within progressive comprehensive standards for the final national economic product which satisfies a specific socioeconomic need of society.

During the last decade of the 20th century scientific research in the area of formulating the demands on the contents of standard technical documentation

should be directed, in our opinion, at creating the scientific methods foundations for formulating the economic demands on industrial output. The task of doubling the country's industrial potential with its radical qualitative updating to the year 2000 can be accomplished only under the conditions of intensive development of the economy on the basis of the acceleration of scientific and technical progress and the saving of all kinds of material resources. Consequently, along with the demands on the level of quality of new industrial products, in the standards it is necessary to formulate the demands on the level of expenditures for achieving this quality. The level of socially necessary expenditures on achieving the required consumer properties characterizes society's scientific-production potential. The interconnection of the level of quality and the expenditures on achieving it is expressed in a ratio between these values in the form of an integral quality indicator.

Thus, the task of scientific research in the area of formulating the demand on standard technical documentation to the year 2000 consists of determining a rational mix of the economic indicators that are included in the denominator of the integral quality indicator. The task could be formulated more broadly as the creation of the scientific methods foundation for an integral evaluation of the new industrial products.

The solution of this problem is bringing about a definite expansion in the sphere of influence of long-range standardization. In point of fact, by the beginning of the next century the closer interconnection of standard technical and standard economic documentation should be achieved. This will bring about the appearance of such economic objects of standardization as the production cost, the specific expenditures per unit of use value, the normative and actual payback periods of capital investments, and others.

Penetration into the economic sphere will require from scientific research in the area of standardization the determination of the rational combination and interconnection of the standard support of such important functions of the management of the national economy as planning (in particular, the formulation of comprehensive scientific and technical programs), price formation, financing, material and technical support, economic stimulation, and others.

It may be assumed that during the first decade of the 21st century, under the conditions of the peaceful coexistence of socioeconomic systems with a different political structure, social questions should also be included in the sphere of influence of standardization. The dialectical treatment of the fundamental economic law during the period of developed socialism, as applied to the tasks of physical production, requires the fullest satisfaction of the increasing demands of the national economy and the population with regard to the quantity, range (assortment), and quality of industrial products with the saving of all types of resources and within the assigned time periods.

The acceleration of our society's socioeconomic development is inseparably connected with the implementation of the provisions of the CPSU Program in its new edition. In our opinion, further improvement of socialist production relations will require the comprehensive solution to the problems of social control on the basis of forecasting and the standard assignment of

socioeconomic guidelines with the participation of specialists in the field of the economics and organization of management, scientific and technical progress, standardization, and others.

New directions in the development of standardization are likewise possible in the future. In particular, at the beginning of the next century increasingly greater attention will be paid to the intensification of social production by means of the considerable reduction in the consumption of all types of nonrenewable natural resources. The results of scientific and technical forecasts, which give preference at the beginning of the next century to such a trend in scientific and technical progress as the creation of fundamentally new synthetic materials, testify to this.

In this case the material resources will already constitute a use value, whose creation should be ensured by a specific level of production of these materials and by outlays of living and embodied labor. Most likely, the proportion of living labor under the conditions of automated production will be accounted for primarily in the form of outlays of intellectual labor (intellectual energy), while the proportion of embodied labor will be accounted for primarily in the forms of outlays of a specific amount of energy.

Here scientific interests in long-range standardization should lie in the area of formulating rational demands on the level of consumption of energy expenditures as a general equivalent of all forms of material expenditures.

On the whole, the development of the socialist mode of production on the threshold of the 21st century requires that scientific research in the area of long-range standardization make a significant contribution to creating the scientific foundations of the efficient management of the national economic complex for the purpose of rapidly building the material and technical base of communism.

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## MEASURES TO IMPROVE PRODUCT QUALITY ANALYZED

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[Article by doctor of Technical Sciences G.D. Kolmogorov, chairman of the USSR State Committee for Standards, under the rubric "Quality Is a Factor of Acceleration": "Quality Is the Main Concern"; capitalized passages published in boldface]

[Text] The problems of radically improving product quality as the most important condition for acceleration and a major and immediate reserve for intensifying production have now been placed at the center of our party's economic policy. The party sees in the solution to the quality problem the most reliable means of an increasingly fuller satisfaction of the needs of the national economy for up-to-date equipment and of the Soviet people for consumer goods. The documents of the April (1985) Plenum of the CPSU Central Committee, the conference held in the CPSU Central Committee concerning scientific and technical progress, and the 27th CPSU Congress speak about this.

At the June (1985) Plenum of the CPSU Central Committee and the 5th Session of the USSR Supreme Soviet, 11th Convocation, the questions of raising the technical level and improving the quality of products were heard again with great urgency and adherence to principle.

In his report at the Plenum, CPSU Central Committee General Secretary M.S. Gorbachev remarked that since the beginning of 1986 there had been noticed a trend toward stepping up the pace in the development of the national economy, and that this is connected primarily with active work by the people and with those positive processes which are taking place in society. But, at the same time, he pointed out that the turn toward quality and efficiency is proceeding with difficulty and not without pain. The Plan of USSR Economic and Social Development for 1986-1990 has posed for industry a serious task--to increase the proportion of products of the highest quality category by a factor of 1.9 to 2.1. In essence, this means that by the end of the 12th Five-Year Plan an overwhelming portion of products should correspond to the world level.

In order to implement the party's course of radically improving product quality, the CPSU Central Committee and the USSR Council of Ministers on

12 May 1986 adopted the decree "On Measures on Radically Improving Product Quality" and a number of documents in its development.

After pointing out the serious shortcomings which are hampering the most rapid possible solution to the quality problem, the party Central Committee and the government specified a complex of organizational, economic, and legal steps which should ensure the output of high-quality machines, instruments, equipment, raw materials, materials, and components. These steps encompass the entire life cycle of products--development, manufacture, monitoring, testing, and certification. The decree aims at creating products of the highest world level, specifies the responsibilities of developers, manufacturers, and consumers, strengthens measures to provide incentives for creating advanced equipment, tightens up the system of monitoring, and sets the task of carrying out a universal education on quality.

The steps outlined by the decree constitute an example of a comprehensive systems approach to the solution of a most complex socioeconomic problem, and they have met with full understanding and support on the part of all working people in the Soviet Union.

The decree sets forth new requirements for Gosstandart [State Committee for Standards] and poses in a new way the questions of its responsibility, rights, and obligations. It is a question, in essence, of a new stage in the development of standardization in the Soviet Union, a new place for Gosstandart within the system of management of the national economy, a significant increase of the role of standardization as a most important motive force of scientific and technical progress and the increase of product quality.

The CPSU Central Committee and the USSR Council of Ministers have deemed it necessary to strengthen the role and responsibility of Gosstandart in carrying out a unified state policy on matters of product quality and obligated the committee to ensure:

- the coordination of the activity of ministries and departments, which is aimed at achieving stable indicators of quality and reliability and a high technical level of the products being turned out;

- the active influencing of the technical level and quality of products by systematically improving standards and bringing their requirements up to the level of international standards;

- the constant analysis of the work of associations, enterprises, and organizations on the questions of improving product quality and the taking jointly with ministries and departments of the measures necessary to cure the production of poor-quality items, with the full exercising of the rights which have been granted to the committee;

- the great efficiency of the activity of the organs of state acceptance;

--the improvement of the state system of standardization and metrology, the increase of the effectiveness of state supervision of the introduction and observance of standards and specifications;

--extensive participation in the work of international standardization organizations this work jointly with ministries and departments.

In essence, this comprises the entire program of actions, which is aimed at raising the technical level and quality of products in the country.

#### The Requirements of Standards Should Specify a High Level of Product Quality

At the present time the most important task is to combine the efforts of industry and Gosstandart for the purpose of establishing a high level of demands on quality by SYSTEMATICALLY IMPROVING STANDARDS AND SPECIFICATIONS.

In the report delivered by CPSU Central Committee General Secretary M.S. Gorbachev at the June (1985) Plenum of the CPSU Central Committee it was stated: "To a certain degree the formed orientation toward an average, or else a low technical level of products was legitimized by the prevailing standards. The system of standards failed to mobilize designers to seek out new solutions and did not place obstacles in the path of producing backward equipment."

For us this is a bitter, but completely just evaluation. Such a situation is a result of the established practice of the work of main and base organizations on standardization in the sectors of industry, as well as insufficiently high demands and persistence of Gosstandart. As a result, only a portion of the prevailing standards can be considered as meeting the highest world level. This pertains particularly to the standards for agricultural machinery, electronic apparatus, and a number of others.

The basic directions of the country's economic and social development, which were adopted by the 27th CPSU Congress, posed the task of speeding up the revision of standards and specifications for products, orienting them toward the highest world achievements. This assignment should be unconditionally met during 1986-1990.

Ministries, departments, and their main and base organizations, need to revise all the state standards for products (and there are more than 9,000 of them) and bring the demands established in them fully in line with the highest world achievements and progressive international standards.

During the 12th Five-Year Plan we have to establish higher reliability indicators in all the standards for machinery and equipment so that all the newly assimilated types of equipment would be 1.5- to 2-fold more reliable than analogous products being produced.

The new, more progressive demands on the standards on the saving of material and energy resources should lead to a reduction of the metal content of machinery by 12-18 percent and the power-output ratio by 7-12 percent.

All this needs to be accomplished in the shortest time. However, the pace adopted today cannot satisfy us in any way. Thus, in the plan for 1986 the ministries intend to revise only 325 standards for products. If the revision were to be carried out at such a pace, we would require not one, but several five-year plans.

In order to correct the situation which has taken shape, we should revise or update at least 40 percent of all standards for products by the end of 1987.

In the industrial sectors some people, who have become accustomed to live by rules which are not designed to speed things, talk about the impossibility of performing such amounts of work within this time. But we have no other way to bring the demands on products up to the world level, and Gosstandart will steadily and as strictly as possible strive to achieve the fulfillment of the tasks posed by the party and the government.

No less urgent is the question of PROGRAMS OF COMPREHENSIVE STANDARDIZATION. The possibilities of goal program planning for increasing product quality by working out sets of interconnected standards have obviously been underestimated both by the personnel of ministries and, unfortunately, by personnel of Gosstandart itself. This affected, for example, the drafting of the five-year plan for state standardization, by which envisaged to formulate only 58 programs during the 12th Five-Year Plan. Not encompassed by the programs are such most important types of products as metallurgical equipment, means of rail transport, and construction and road machinery. The main ministries for these types of equipment need in the briefest possible time to correct the situation which has taken shape and to guarantee the formulation of programs of comprehensive standardization for all machinery, equipment, and instruments of the greatest importance to the national economy precisely during the 12th Five-Year Plan. Especially as the decree "On Measures on Radically Improving Product Quality" has granted to the developers of end products the right to establish obligatory assignments for the suppliers of materials and components as to their technical level, reliability, and quality.

It is important to ensure the quality and comprehensiveness of the programs themselves. For example, a procedure has been established in accordance with which in the programs of comprehensive standardization the requirements of the highest degree of standards with long-range requirements should be implemented. However, this most important condition is far from always observed. As a result, the method of comprehensive standardization is not working actively enough for the benefit of the planned development and delivery to production of new equipment which conforms to the highest world level.

Irreparable harm is being done to comprehensive standardization by numerous adjustments to the programs during the process of their fulfillment, which essentially emasculate them and transform them from intersectorial into narrowly sectorial ones. The Automotive Transport Vehicles, Hydraulic Drives, and Precision Castings Programs, unfortunately, were subjected to such operations during the process of fulfillment.

Such a practice must be completely eliminated. The committee has issued a directive to its own administrations and organizations to sharply increase demands on the developers of programs and the performers of the assignments established in them.

The decree "On Measures on Radically Improving Product Quality" has provided for the development in 1986 by ministries and departments, associations and enterprises of SCIENTIFIC AND TECHNICAL GOAL PROGRAMS OF THE INCREASE OF THE QUALITY AND RELIABILITY OF PRODUCTS FOR 1986-1990 AND THE PERIOD TO 2000.

In ascribing great importance to the goal program methods for controlling product quality, Gosstandart its institutes and territorial organs during the last five-year plan actively participated in developing Quality programs in sectors and regions of the country and at associations and enterprises. On the one hand, the experience of this work has shown the genuine possibility for a goal program influence on the level of product quality, but, on the other hand, it has revealed specific shortcomings in the methods and practice of carrying out the programs.

The decree specified fundamentally new principles of an in-depth, comprehensive approach to working out the Quality program.

The work on increasing product quality should begin with the conducting of basic and applied research and the forecasting of the quality indicators for the future, including the demands on the reliability and operating life of equipment.

The programs should envisage the provision of all the conditions for test bench development of items, testing and monitoring, and the development of the necessary control and measuring, testing, and diagnostic equipment.

The programs should envisage without fail measures on metrological support and the application of up-to-date methods of designing of components.

The drafting of standard technical documentation, which establishes the leading demands on products and on all their component parts, as well as on the equipment, tools, and instruments necessary to produce them, should be an integral part of the goal programs.

It has been proposed to enlist in the formulation and implementation of the programs interbranch scientific technical complexes, as well as the State Committee for Science and Technology, USSR Gosplan, and the USSR Academy of Sciences.

The attention of the ministries should now be focused on seeing to it that the programs would be formulated in 1986 and would be the basis of systematic work on radically improving product quality during the 12th Five-Year Plan.

A serious task is arising--to ensure the close coordination of the goal programs with the programs of comprehensive standardization and with all the work on revising the standards and establishing long-range indicators in them.

In recent years there has been considerable talk about the great importance for raising the technical level and quality of products of STANDARDS WITH LONG-RANGE REQUIREMENTS. However, many sectorial ministries and their main and base organizations continue to have an irresponsible attitude toward the development of these types of standards. In 1985 more than a third of the plans were returned for modification, and during the current year the practice of including in the draft of standards indicators of productivity, reliability, the materials-output ratio, and the power-output ratio, which are at variance with the requirements of the Basic Directions of Economic and Social Development, is continuing. Among such drafts were the drafts of standards for beet-harvesting machines, corn-harvesting combines, timber industry tractors, and a number of other most important items for the national economy. It is necessary to resolutely overcome such inertia.

The policy of intensifying the economy assigns to machine building the vanguard role in carrying out the plans of modernization of the national economy. This requires the raising of the technical level and quality of machinery, equipment, and instruments and the extensive introduction of automation.

In the plans of improving the standards and specifications in order to bring their requirements up to the highest world level, a special place should be occupied by EFFORTS ON STANDARDIZATION IN THE PRIORITY TRENDS OF TECHNICAL PROGRESS. And it is precisely here, where equipment advances at a very rapid pace, that the methods of the rapid formulation of standards, including the method of formulation of standards by working groups, which is envisaged by the new versions of the State System of Standardization, should find extensive application. This method's great effectiveness has been confirmed by experience: over a period of 2-4 months working groups of specialists from Gosstandart, industry, and the client worked out fundamental standards for color television sets and the picture tubes for them and made fundamental changes in the standards for integrated circuits. At present a recently approved standard for personal computers was formulated by the same method.

It is impossible to successfully accomplish the task of raising the scientific and technical level of domestic standards and ensuring the competitive ability of products without the extensive UTILIZATION OF ADVANCED FOREIGN KNOW-HOW AND PARTICULARLY THE INTERNATIONAL STANDARDS OF THE INTERNATIONAL ORGANIZATION FOR STANDARDIZATION AND THE INTERNATIONAL ELECTROTECHNICAL COMMISSION. The collection of these documents contains the most valuable scientific and technical information, including ready-made technical solutions, which have been tested at the international level. But this collection is being used entirely inadequately.

The decree "On Measures on Radically Improving Product Quality" requires that we carry out a radical organization of the work of all information organizations and services, having in mind the creation of an effective information system of the country for the continuous and purposeful provision of developers and other interested organizations with the necessary data regarding the latest achievements and trends of development in the corresponding directions of domestic and foreign science and technology.

This requirement places special responsibility on us as the holders of the collection of international and foreign standards.

At present the task has been posed to bring the use of foreign standards up to 75-80 percent by the end of the 12th Five-Year Plan. It is a question of their direct utilization as USSR state standards in the same way as is now done with CEMA standards.

#### The Foundation of Quality Control Is Analysis, Evaluation, and Monitoring

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on Radically Improving Product Quality" assigned an entirely new function to Gosstandart--to ensure a constant analysis of the work of associations, enterprises, and organizations on the questions of increasing product quality and the taking jointly with ministries and departments of the necessary steps to curb the production of poor-quality items with the full exercise of the rights which have been granted to it. These are the registration of specifications, the certification of products, the issuing of certificates, state tests, state acceptance, and state supervision.

One of the basic forms of analyzing the level of the quality of a product being turned out is CERTIFICATION BY TWO QUALITY CATEGORIES. The systems of the material stimulation of the production of high-quality products and the imposition of sanctions for producing items which do not measure up to the world level are based precisely on it.

The conversion to the new Procedure of Certification by Two Quality Categories has had a positive effect on the objectivity of evaluating products; there have been fewer instances of the undeserved awarding of a higher quality category. As a result, after recertification for conformity to the new requirements more than 9,000 items were deprived of their State Emblem of Quality.

Also noticeable are the results of the 100-percent expert appraisal introduced by Gosstandart with regard to the decisions made by the state certification commissions. The ministries have now begun to approach more rigorously the presentation of materials for certification. Whereas at the beginning of this work the decision to award the highest category was rejected in one out of every three items, today no more than 10-12 percent of the decisions made by the ministries' certification commissions are rejected. Of course, even this proportion is still too great.

The principal shortcoming of certification continues to be the still numerous instances of a lack of conformity of the actual level of the products being turned out to the category which they have been awarded. In 1985, under the conditions of the conversion to the new Procedure of Certification, this was expressed in the stripping of the Emblems of Quality from 3,000 descriptions of products. During the first 6 months of 1986, 440 different products, including 220 for the machine building ministries, were deprived of the Emblem of Quality.

As was previously the case, the certification of new equipment gives cause for alarm. In the 1986 plan it is envisaged to certify all the products being assimilated as belonging to the highest category. However, already in the first quarter a portion of the new items received only the first quality category. Evidently, USSR Gosplan ought not to take into account for enterprises and ministries the fulfillment of the plans of the assimilation of such "new" equipment.

In the decree of the CPSU Central Committee and the USSR Council of Ministers it was noted that Gosstandart is not fully exercising the rights which have been granted to it with regard to curbing the production of low-quality items. Unfortunately, it must be said that STATE SUPERVISION has not yet become an effective lever for improving the quality of products, work, and services and has not provided a reliable barrier in the way of defective items to consumers and purchasers. At the works one continues to encounter instances of gross violations of the requirements of standards and specifications and the output of low-quality products.

The results of the first half of 1986 show an unfavorable situation with product quality at enterprises of the Ministry of the Automotive Industry, the Ministry of the Machine Tool and Tool Building Industry, the Ministry of the Electrical Equipment Industry, and a number of other ministries.

All of this requires an increased strictness on the part of the state inspection organs.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on Radically Improving Product Quality" has provided for the creation of extradepartmental STATE PRODUCT ACCEPTANCE, which is subordinate to Gosstandart. The adoption of this decision was preceded by an experiment which was conducted at 19 machine building enterprises beginning in early 1985 and which fully justified itself.

At these enterprises, where the representatives of Gosstandart worked, there was a reduction in the instances of defective goods and complaints and the technical control services were strengthened.

The procedure established by Gosstandart, in accordance with it the personnel, who are carrying out the acceptance, report on instances of deliveries of poor-quality raw materials, materials, semifinished goods, and components to Gosstandart's territorial organs at the place where the supply enterprises are located for the taking of the necessary steps, proved to be effective.

At the present time a decision has been adopted to introduce state acceptance at 1,455 associations and enterprises of 28 ministries. Serious preparatory work should precede them.

The experiment demonstrated that state acceptance should be carried out by skilled specialists, who have working experience in the field of quality control, have a good knowledge of the given works, and are capable of firmly defending state interests.

The very difficult problems of the selection of managers and the manning of the acceptance services is now being solved in close contact with the local party organizations and sectorial ministries. So that the introduction of state acceptance may not cause complications in production, the ministries and the associations and enterprises subordinate to them need to bring the documentation into full accord with state standards, to adjust the technological processes, to check the accessories and the tools, to organize and further equip the control and testing stations, laboratories, and workshops with the necessary stands and instruments, to ensure the timely conduct of periodic tests, to organize control posts of the division of technical control and the section of the incoming controls of arriving materials and components, to furnish them with the necessary documentation, means of measurements and tests, and equipment, to ensure the development of self-control and the introduction of the brigade forms of the organization of the labor of the controllers of the division of technical control, that is, to conditions necessary for the successful operation of state acceptance.

It should be emphasized that the introduction of state acceptance at enterprises in no way signifies any weakening of state inspection of the standards and the means of measurement, which is carried out by Gosstandart's territorial organs. The decree of the CPSU Central Committee and the USSR Council of Ministers, which obligates Gosstandart to ensure the increase of the effectiveness of state inspection of the introduction and observance of standards and specifications, also directs attention to this.

Not the opposition, but the combination of the forces of the organs of state inspection and state acceptance should provide the ultimate effect--the radical improvement of product quality in each individual sector and in the country as a whole.

In connection with the introduction of state acceptance at major enterprises, Gosstandart's territorial organs have received the possibility of concentrating more attention on inspection of the observance of standards among the suppliers of materials and components and of consumer goods, in the sectors of the agroindustrial complex, in the service field, in storing and transporting products, as well as in such an important matter as the conservation of resources.

Proceeding from the new tasks and the increase of the role of Gosstandart in the work on product quality, it is necessary to pay serious attention to improving the METROLOGICAL SERVICE OF THE NATIONAL ECONOMY.

At the present time the demands on metrological activity have been basically formulated. Among them are:

- the increase of the accuracy of state standards of weight and measures, standard working means of measurements by a factor of 3-5 on average;
- the increase of the productivity of checking, certifying, and measuring operations by a factor of 5-7;

--the decrease of the labor intensiveness of measuring operations by a factor of 2-3;

--the shortening of the time of the metrological servicing of the means of measurements by a factor of 3-4;

--the increase of the utilization ratio of standard means of measurements and checking equipment from 20-30 percent to 60-70 percent;

--the assurance of the checking of instruments primarily at the locations where they are being used without being transported to test laboratories.

#### Master Up-To-Date Skills and Methods of Developing and Producing High-Quality Products

The party is constantly drawing our attention to the fact that the matter, which was begun by the April (1985) Plenum of the CPSU Central Committee and underwent development in the decisions of the 27th CPSU Congress, is connected with reorganization not only in the economic sphere, but also throughout society. This process requires serious changes in the thinking of personnel.

The problems of quality also do not constitute an exception. The attitude toward evaluating the results of work not merely by quantitative, but also by qualitative criteria must be inculcated by persistent ideological and propaganda work, and personnel must be provided with knowledge of the methods and means of ensuring high product quality.

The CPSU Central Committee and the USSR Council of Ministers have posed a specific task--to conduct during 1986-1987 the universal education of workers and engineering and technical personnel in questions of quality. In connection with this, Gosstandart has to head the work of the leading development of the training of specialists in the field of standardization, metrology, and quality control. No sphere of instruction--from basic training to a system of retraining and the improvement of skills--should be ignored. The wide network of propaganda centers of the All-Union Council of Scientific and Technical Societies and the All-Union Society for Knowledge, Gosstandart's Houses of Quality, and the quality offices at associations and enterprises should be enlisted in this.

The instruction of the state acceptance workers should be placed under special controls, since whether Gosstandart will be able to place a reliable barrier in the way of the production of poor-quality items depends precisely on their skills and ability.

The accomplishment of the tasks posed by the party and the government on radically improving product quality is placing in the foreground the work on providing extensive information on and promoting these questions.

Together with the State Committee for Television and Radio Broadcasting and the editorial boards of newspapers and journals Gosstandart has been charged to cover the experience of the work of collectives of associations, enterprises, and organizations, leading production workers, quality groups,

technical control services, state acceptance organs, and party, soviet, and Komsomol organizations on ensuring high indicators of product quality and to sharply criticize slipshod workers and violators of standards, specifications, and technological discipline.

In reality, with the help of the mass media the tasks and point of the formulated program of increasing product quality has to be made known to every Soviet individual--the worker, the engineer, and the employee--and the progress of its implementation has to be covered.

It is necessary to stimulate ideological educational work in the field of quality throughout the country.

The results of the work of our entire industry on solving one of the most important problems of the 12th Five-Year Plan--the radical improvement of the quality of the products being turned out--will depend on how energetically and practically instruction in the promotion of the questions of standardization and quality control are carried out and on how fully we are able to utilize the human factor.

#### An Intersectorial Headquarters of Quality

The CPSU Central Committee and the Soviet Government have posed for Gosstandart the task--to ensure coordination of the activity of ministries and departments, which is aimed at achieving stable indicators of quality and reliability and a high technical level of the products being turned out. In essence, this is a new function for Gosstandart, which is transforming it into an intersectorial headquarters of quality. Although in many directions of the committee's work particular tasks of intersectorial coordination were also accomplished earlier, the task is being posed for the first time in such a concentrated purposeful form.

The plans for state standardization and the extensive use of the goal program method of comprehensive standardization have bound together into a single unit the demands on the final product, the raw materials, materials, components, and equipment, which are being produced in various sectors of industry. The state system of standardization constitutes a unified complex of standard technical documentation at all levels of management: intersectorial, sectorial, territorial, and of the association and enterprise. It is possible to name a number of intersectorial systems of standards, which are aimed at creating the conditions for the mutual coordination of the work of the sectors among themselves. At the present time, however, Gosstandart is required to carry out coordination of a deeper nature, and not merely through standard technical documentation (although this, too, is very important).

In order to manufacture up-to-date machinery, high-quality structural materials are needed. In order to turn out high-quality products, metallurgists, chemists, and a number of other sectors need high-quality raw materials, up-to-date highly productive and reliable equipment, and so on.

Gosstandart's task is to exert an effective influence through state acceptance and the territorial organs of state inspection, which are interconnected with

it, on the quality of specific types of raw materials, materials, and components, which are being supplied on a cooperative basis and determine the quality of the final product.

The work carried out by the Moscow Center for Standardization and Metrology at the Krasnyy proletariy Machine Tool Building Plant can serve as a vivid example of such a new approach to coordination.

In connection with complaints about the quality and particularly about the reliability of the robotic complexes being turned out by the plant, a specially created brigade conducted an analysis of the causes of their low reliability. The revision of the specifications was carried out, and steps were taken to increase product quality among the suppliers of electronic and electrical items, including the establish of special conditions of acceptance by Gosstandart's territorial organs. At the main enterprise steps were taken on improving technology and quality control. All this has yielded its own positive results. At present the previously halted acceptance of these complexes has been resumed.

A fine example of coordinated work is the interaction between the centers of standardization and metrology, the All-Union Scientific Research Institute on Standardization, the sectorial main and base organizations, the territorial organs of management, and the councils on quality attached to the party organs in Moscow, Dnepropetrovsk, Latvia, and a number of other cities and regions. This practice must also be further expanded.

The creation of a permanent system of presenting information to the organs of party and state supervision at all levels, which has been gathered as a result of analyzing and generalizing the materials on product quality and the steps being taken to improve it is new in our work on coordination.

The assigning of the functions of a coordinator of the work on quality to Gosstandart is a consequence of objective processes in the development of the national economy, the increase of the social and economic significance of the level of product quality, the considerable strengthening of the coordinating and guiding role of standards, and, consequently, the change of Gosstandart's place in the system of management of the national economy as the organ of state management, which is responsible for a unified state policy in matters of product quality.

The principled decisions of the party and the government on questions of quality are crucial in the life of the country and determine the prospect of radical organization and acceleration.

In essence, these decisions specify a precise and long-range program of actions and the responsibility of Gosstandart, ministries and departments, associations and enterprises for implementing steps which ensure a radical improvement in product quality.

All our efforts should be directed at creating in 1986 a reliably operating system for the state acceptance of products, the implementation of the effective coordination of the work of industrial sectors on quality, and the

fulfillment of other tasks of the active influencing by standardization of the acceleration of scientific and technical progress.

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2384

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## FACILITIES AND MANPOWER

### READER RESPONSES TO ARTICLES ON INSTITUTE CLOSINGS

Moscow IZVESTIYA in Russian 25 Aug 86 p 2

[Letters to the Editor under the rubric "The Opinion of the Reader: For, Against, a Special View"; first paragraph is IZVESTIYA introduction]

[Text] IZVESTIYA is receiving many responses to B. Konovalov's articles "Why Are They Closing the Institutes" and "Entrust, But Check" (No 203 and No 204, 1986). Today we call the readers' attention to a few of them.

#### Clear the Field of Science

IZVESTIYA is correct in asserting that now the financing of "signs," behind which there are no actual scientific institutions, often occurs. The truth is that we do not have the 1.5 million scientific workers, about whom the Central Statistical Administration reports, and one-quarter of the world's scientists are not working in our country. All of that is self-deception and an illusion.

The statistics group with scientists thousands of people, who are registered at institutions which, though called "scientific research," in fact do not deal with science. Are the many hundreds of scientific research institute associates really needed for the devising of methods of ginning weedy cotton, the development of pavements, the designing of vegetable garden implements, and many other useful and important things? The labor of a designer or process engineer is needed here, but there is nothing for the scientist to do. The epithet "scientific research" is added to institutions for the purpose of creating a certain prestige and privileges, which are associated with wages, leaves, business trips, and so forth.

Let us clear the field of science and start calling a spade a spade. It is not always necessary to cover up something: let us call things by their own names. Let a certain scientific research institute [NII] become a design bureau or technological laboratory, if the corresponding useful development is being performed there.

On the other hand, so that a sectorial NII would be a genuine research institute, it is worth encouraging the development at it of truly scientific, including basic, development. It has been traditionally carried out, for

example, at the Central Institute of Aerohydrodynamics imeni Zhukovskiy, from which many of the country's most prominent scientists have come.

In order to clear the field of science it is also essential to look into the endless affiliates, laboratories, and divisions that are being created in outlying areas by the central NII's.

In a number of cases it is useful to transfer a sectorial institute or its subdivision to the jurisdiction of a specialized VUZ. This would eliminate the absurd situation when at some NII's there is not a single candidate for each 100 people, while the possibilities of tens and hundreds of professors and docents at a VUZ are not being used because of the lack of a pilot production base.

Finally, the time has come to take a serious look at the plant sector of science. Many tens of thousands of people are working here, but still no one precisely knows: Are they doing any work and who is supervising them? From my own observations I know that many are doing work: operational production control, analytical tasks, engineering development, technology improvement, and the determination of the prospects of modernization and renovation of their own enterprises. However, the workers of plant science have been assigned to the nonproduction sphere, to the category of administrative and management personnel. Under these circumstances how can we realize the motto of transforming science into an immediate productive force and the production process into the application of science? The attitude toward them is also in keeping: at the slightest provocation there is a reduction in staff, the corresponding wage, and their use for any urgent tasks, weeding, and the sorting of vegetables. As long as plant science is included in the administrative and management apparatus, along with the cleaning women and watchmen, it will be difficult to speak about scientific and technical progress.

One must also say that the number of inspection organizations, inspectors, and inspection commissions is becoming frightfully large, but it is of little use. The real danger of replacing systematic science administration by unpredictable spontaneous forays by the control organs has arisen. Like any job, control must also be organized.

[Signed] Corresponding Member of the USSR Academy of Sciences Yu. Zhdanov, Chairman of the North Caucasus Scientific Center of the Higher School, Rostov

#### Is It Necessary to Reduce the Number of Planners

Let us see why many sectorial institutes are an extension of the staff of ministries and why and where this trend got started. The complexity of the national economy and accordingly the amount of administrative planning information are growing at a rate that is proportional to the square of the production volume. Thus, whereas the production volume has increased by ten- to fifteenfold since the 1950's, the complexity of the national economy and the amount of administrative information has grown by 100- to 225-fold. Therefore, whether we wish it or not, the growth in planning and administrative personnel is becoming an objective law.

In all of the developed countries the trend is such that the information and service spheres will grow even further, while the proportion of industrial workers will constantly decrease as a result of production automation.

Many "die-hards" have gotten it stuck in their head that the work of administrators and planners constitutes the nonproduction sphere and that their number needs to be reduced without fail. Therefore, the ministries under the conditions, when their staffs are frozen or reduced, are forced to develop NII's which would perform some of the functions of the management staff. This kind of situation places administrators and planners in a demeaning position. But their work volume is enormous and the ministries are hardly able to cope with it even by recruiting personnel from their own institutes. Therefore, it is necessary to treat circumspectly the questions of the reduction of the NII's which are assuming a part of the functions of the ministerial staff.

Look at what is happening now--the preparation of a ministry's annual plan takes up the entire preceding year. Now, for example, the "coordination" of the plan for 1987 is in full swing. The plan for 1986--the first year of the new five-year plan was under preparation during the entire year of 1985. Only in June 1986 did the session of the Supreme Soviet meet to approve the five-year plan. This means essentially that the plan for 1986 was compiled without the instructions of the five-year plan. In order for the five-year plan to have been indicative for the annual plans, it would have been necessary to approve it at the end of 1984 or at the very beginning of 1985 at the very latest.

In order to change this situation radically, it is necessary to use computers as extensively as possible in the preparation of plans and to have data banks on the status and long-range development of each sector. Unfortunately, the computerization of the administrative process, particularly at the ministerial level, is still proceeding at a snail's pace.

[Signed] Academician G. Pospelov, Moscow

#### Eliminate the Unnecessary Units

It seems to me that not only individual scientific research institutes are not bringing their output "up to the surface." Thus, for example, at many of the country's plants affiliates of the main OKB's [experimental design bureaus] exist alongside series design departments. As a whole, the collectives of these affiliates of OKB's and the design departments of plants are enormous, but duplicate each other's work to no small degree. I believe that it would be advisable to unite the designers, having subordinated them to the plant general director. In this case a large number of designers would be freed. Drawings and other technical documentation would be more efficiently processed

and put into production with a high sense of responsibility and interest.  
Life urgently requires the elimination of unnecessary units.

[Signed] A. Bereslavskaya, Kuybyshev

6289

CSO: 1814/53

## TRAINING AND EDUCATION

### IMPROVEMENT OF TRAINING, CERTIFICATION OF SCIENTISTS

Moscow IZVESTIYA in Russian 30 Aug 86 p 3

[Interview with Chairman of the USSR Higher Certification Commission Professor Viktor Grigoryevich Kirillov-Ugryumov by B. Koltovoy: "On Degree Candidates and Degrees"; date, place, and occasion not given]

[Text] Under present conditions science's role and responsibility in the matter of increasing efficiency of social production are increasing markedly. What is the Presidium of the VAK [Higher Certification Commission] doing in order to raise the quality of training of scientists of highest skills?

[Answer] Every year approximately 3,000 doctors of sciences about 30,000 candidates of sciences in the country successfully defend their dissertations. About 400 dissertations, which passed through local specialized councils, have to be rejected. But it would be premature to say that we have succeeded in erecting a reliable barrier against the penetration into science of creatively incompetent candidates for a degree. The expert councils and collegium of the VAK do not always analyze thoroughly enough the real value of dissertations. Consequently, poor works, which give theory and practice hardly anything, sometimes receive a passing grade.

In short, it is necessary to increase the demands on the skills of persons who seek academic degrees. At the same time we need to eliminate everything that creates unjustified difficulties in the preparation of dissertations, their appraisal, and the making of final decisions.

Therefore, the Presidium of the USSR VAK decided to make changes in the standard certification documents and has prepared a draft of the new version of the Statute on the Procedure of the Awarding of Academic Degrees and the Conferring of Academic Titles, which will be submitted for consideration by the USSR Council of Ministers.

But I believe it is necessary to emphasize that in any matter what counts is not instructions, but people. Therefore, our first priority task is to change the thinking and the style and methods of work of all links of the Higher Certification Commission.

The root of the shortcomings in the style of our work and of the causes of the complaints about the quality of dissertations appraisals to a significant degree lies in the attitude toward the assigned job of those persons who have been entrusted with carrying out certification. For if a member of the council or an opponent, a representative of a leading organization is concerned not about the objective evaluation of the dissertation, but about not offending the people behind the back of the dissertation writer, then it is practically impossible to erect a strong barrier against the penetration of failures into science. But, unfortunately, one has occasion to be faced with similar phenomena.

So that all the links of the certification system would function reliably, it will be necessary to increase the personal responsibility for the quality of the appraisal and for the objectiveness of the conclusions and opinions about the substance of dissertations. At the same time responsibility must without fail be backed by moral and material incentives for those who irreproachably execute their duty in the certification system.

[Question] The 27th CPSU Congress and the June Plenum of the Central Committee criticized the methods of work of the central departments. They are swamped with chores, resolving questions with which the local links could deal. Mention was made of the need to democratize management. Presumably, the Higher Certification Commission is also drawing conclusions from what was said.

[Answer] You are right. Our serious shortcoming lies in the fact that the omissions of the local organs of the certification system--the specialized local councils--were not eliminated by these organs themselves, but only through the active intervention of the upper echelon of management.

We need to shift the center of gravity of the work to the specialized councils as the basic link in the certification system. And it should bear the main responsibility for the scientific and practical significance of the defended dissertations. It is proposed to regard henceforth the decision of the specialized council to award the degree of candidate of sciences as final. (At the present time the entire flow of candidate dissertations goes through the VAK collegium.) This step will be of fundamental importance. In the first place, the ministries, at whose suggestion the specialized councils are established, must thoroughly examine the quality of the scientific research being conducted in the sectors. In the second place, it is possible to intensify significantly the analytical activity of the VAK and the study of the orientation and quality of scientific research on the basis of the analysis of the entire collection of dissertations.

Of course, we will monitor the work of the councils. And if the conclusion of a council on the quality of a dissertation turns out to be incomplete, if complaints or reprimands related to the defense go unanswered, then our expert commissions, or else the collegium will have to intervene. If it becomes clear that the council cannot eliminate the mistakes independently, we will have to decide whether it is worth entrusting to such a council in the future the examination of dissertations.

I want to add that the appeal to increase the greater responsibility of the specialized councils for the quality of certification will remain wishful thinking, if the responsibility of those people, who send the specialized councils distorted information about the reliability of the primary scientific data of the dissertation writer and his personal contribution to the scientific results, is not established by law.

If we speak about the further development of democratic principles, it is proposed to broaden the rights of degree candidates, having afforded them opportunity to defend their dissertations in the face of any opinions and findings, including negative ones.

And in general more attention must be given to the dissertation writers. For at the stage of preparing for the defense they are in reality defenseless. Sometimes scientific supervisors and scientific secretaries of the councils, taking advantage of this, turn over to the dissertation writer all sorts of worries about the organization of the defense. While demanding of candidates for an academic degree a high quality of scientific work, we must also create the conditions for them and spare their time and nerves.

[Question] Viktor Grigoryevich, it was said at one of the VAK plenums that scientific degree candidates undertake the defense of dissertations at an excessively advanced age: they become candidates of sciences at 37, doctors at 48. How is our science to be rejuvenated?

[Answer] We must begin with the reform of the work with students at the higher school. The CPSU Central Committee's draft "On the Basic Directions of the Reform of the Higher and Secondary Specialized School" quite correctly speaks about the need for the intensified training of students, who have demonstrated an aptitude for creative scientific and technical work, in accordance with individual curricula. The experience of our generation indicates that the work schedule of a student, who has chosen a scientific career, can be more intense than that of others. And he will more quickly mature for serious research work.

However, the "rejuvenation" of candidates of sciences and their training in priority directions of scientific and technical progress depend to a decisive degree on the improvement of the quality of graduate studies. This is a separate question and it must be resolved immediately. For almost half of the graduate students today not only do not keep to the established deadlines of the preparation of dissertations, but are also not at all able to prepare them.

The higher school and sectorial science must more carefully select young specialists for graduate studies, must with the first steps aim them at work in promising fields of science and technology, must create the appropriate conditions for them, and must increase the responsibility of scientific supervisors for graduate student training.

If the solution of these problems is not undertaken in earnest, science will continue to "grow old."

[Question] The question of the fundamental unification of science and industry is now urgent. And at the same time the process of industrial "descientification" is taking place. Only 1.5 percent of the candidates of sciences and 0.2 percent of the doctors of sciences are directly employed in industry. You must agree that the figures are alarming. What is happening here?

[Answer] It is a matter first of all of the position of the managers of production itself. If at a plant the technology is outdated and they do not wish to change it fundamentally, there is nothing the candidates and doctors of sciences can do here. If we speak about the significant acceleration of scientific and technical progress and the basic retooling of production, then one cannot get along without engineers with highest scientific skills. An example of this is many enterprises of the electronics industry. It is no accident that here young engineers defend as dissertations the latest technological processes which they have developed.

The USSR VAK proposes to devote special attention to creatively active engineers. At the end of the past year we examined in our presidium the question "On Recommendations on Stimulating Defenses of Dissertations by Production Personnel in the Form of Scientific Reports." The directors of the main sectorial scientific research institutes, the supervisors of state scientific and technical programs, as well as the scientific and technical councils of ministries and departments have been given the right to issue recommendations on the defense of dissertations in the form of a scientific report. The criteria for evaluating the works of those candidates for the academic degree of candidate and doctor of technical sciences, who are the authors of the principles of advanced technologies, fundamentally new machinery, instruments and materials, and means of information science, which significantly influence the acceleration of scientific and technical progress, will be broadened.

[Question] Viktor Grigoryevich, the two-stage system of certifying scientific personnel which has formed in our country, has been repeatedly questioned in the press, as well as at various scientific meetings. Here the following line of reasoning is cited: the preparation of two dissertations, first the candidate, and then the doctoral dissertation, for a long time keeps the scientist from the pursuit of science proper. What is the VAK presidium's position?

[Answer] The Soviet system of certification is different from the one which has been adopted in many capitalist countries. First of all, it is decentralized there, each university has its own requirements. In addition, in the capitalist countries there is an extremely complex and multistaged system of degrees: the baccalaureate, the master's degree, the doctor of philosophy degree, and others.

I am convinced that the existence of the two academic degrees that have been adopted in our country and in other socialist countries, is completely justified. These degrees are indicative of the different level of their holders' scientific maturity and skills.

The preparation of a dissertation demonstrates the candidate's aptitude for generalizations and the obtaining of qualitatively new scientific conclusions and makes it possible to identify his personal contribution to the problem under examination. This is all the more important because contemporary scientific work is to a significant degree collective.

The dissertation preparation problems, in connection with which people often complain, that have been such frequent come up only when the dissertation is an end in itself, and not a logical consummation of a planned scientific work. Moreover, the completion of precisely a scientific work, and not its substitute.

We have constantly emphasized that dissertation writers must present their work in a brief form. As many years of experience have shown, a voluminous dissertation is a sure sign that serious scientific achievements are lacking. On the other hand, a laconic dissertation or scientific paper does not require serious expenditures of time on the part of the genuine scientist.

[Question] Publishing houses that print scientific journals and collections have been complaining about the overloading of the files of manuscripts being edited. Candidate degree aspirants are compelled to make no small contribution to the flow of manuscripts. For in accordance with the statute they need to publish articles on the research theme prior to the defense. Has not the time come, perhaps, to review that requirement?

[Answer] I believe so. Very often a graduate student spends years on publishing his research results. And in consequence, he does not keep to the established time of doing graduate studies. Degree seekers who work in the plant sector of science are also experiencing difficulties.

For degree seekers, who are creatively participating in the development of high-performance machinery, instruments, new materials, and advanced technologies, as well as correspondence graduate students it is sufficient to publish the results of their scientific work in the form of a dissertation abstract. In such a case, of course, the number of printed copies of the abstract must be increased. Of course, publications in scientific journals are essential for a doctor of sciences.

In conclusion I want to say that the VAK collegium is actively seeking ways of improving all operations of the certification system. And if interesting suggestions on this account appear in the mail of IZVESTIYA, we will carefully consider them.

6289

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## FAR EASTERN SCIENTIFIC CENTER OPERATIONS REVIEWED

Moscow PRAVDA in Russian 16 Oct 86 p 3

[Article by Academician V. Ilichev, chairman of the Presidium of the Far Eastern Scientific Center of the USSR Academy of Sciences: "Oceanic Science Outpost. Intensify Progress"; first paragraph is PRAVDA introduction]

[Text] When the foundation of the Far Eastern Scientific Center of the USSR Academy of Sciences was laid down 16 years ago, a heavy burden was placed on its young shoulders: in a short time having created a solid material and technical base, to develop basic and applied research in the natural and social sciences, which is conducive to the rapid development of the Far East's economy and productive forces. And, in training personnel, to coordinate the research of the scientific subdivisions located in its territory. Was the scientific center able to accomplish everything that was planned and thought out? What has been the result of the scientists' efforts?

A solid scientific base has been established at the DVNTs [Far Eastern Scientific Center]. Now 22 institutes, 50 permanent bases, marine stations, and preserves are in operation. A scientific research fleet plows through the seas. The center has about 10,000 persons, including 2,400 scientists, among whom are 2 academicians and 14 corresponding members of the USSR Academy of Sciences, 100 doctors of sciences, and 1,108 candidates of sciences.

The scientists' efforts have been primarily concentrated on studies of large-scale problems, such as, for example, a comprehensive study of the world ocean. Interesting information has been obtained on the geology and metallogeny of the Pacific ore zone. Approximately 200 mineral deposits were identified in Maritime Kray alone, and one-half of them are already being worked. Recommendations have been issued on the commercial exploitation of petroleum and gas deposits on the northeastern sea shelf of the Pacific. The elaboration of fundamental problems in geology and geophysics resulted in the compilation of detailed geological and geophysical maps of the Far East and the peripheral seas.

Almost each institute of the DVNTs has interesting scientific research results. And recently the compilation of the Far East Comprehensive Goal Program was completed. Its principal goal is the creation of a Far Eastern highly efficient national economic complex, which has been integrated in the

system of the national and international division of labor, with its own major resource and scientific production base, an optimal economics structure, and a developed social sector. "I see that you are ready to take on the solution to this problem," said M.S. Gorbachev during a visit to Vladivostok. "And I think that perhaps you, who have lived here for years and decades, know even better that this, the large-scale development of the Far East, is no easy task."

Yes, indeed, very, very difficult work lies ahead. Scientists became convinced of that as they worked collectively on the Far East Program. Under the conditions when the Far East's economic growth rate is below the national rate and many social problems have not been solved, the enormous exertion of all efforts, including of science, will be required in order to achieve the goals that have been outlined.

In recent times, when comparing the achievements of Far Eastern science with the prospects of its development, we became convinced that much will have to be reexamined and reevaluated. For example, in a 16-year time period the center in practice did not study the problems of power engineering, petroleum, and gas. Research in the area of the mathematical mechanics and physical technical sciences was not sufficiently developed. Here the economic impact from the introduction of scientific research results proved to be low. The reason is the very poor development of the institutions connected with these directions. Science-intensive sectors--the production of radio electronic equipment and machine building--have in general not been "supported" by either academic or sectorial science of the region. The special conditions of the Far East as a geological and geographical region--the largest ocean, volcanism, a diversity of minerals and biological resources--predetermine the advisability of planning the future development of the Far Eastern Scientific Center of the USSR Academy of Sciences so that it would become the main one in the country in a number of fundamental directions.

During the current five-year plan we must improve the organization of the region's academic science--establish an Institute of Theoretical and Applied Mechanics in Vladivostok, a Machine Science Institute in Komsomolsk-on-Amur, institutes for metallurgy, mathematics, physiology, plant biochemistry, and a number of others. We must also strengthen the material and technical base of science, establish order in the use of our personnel, and improve the management staff.

A key task of the staff is to organize and strengthen the link between science and industry. The DVNTs turned the results of 759 research projects over to various sectors of the national economy during the past five-year plan--threefold more than during the 10th Five-Year Plan. But what was their fate? The total economic impact was not very much--71.8 million rubles. Only one-fifth of the total number of inventions is being realized. But here, I believe, it is frequently the fault of not only the "inert" manager, but also the scientist who did complete his work with proper pilot experimental testing.

The pace of the introduction of scientific development increased appreciably, when we started to be concerned about the establishment of our own pilot

experimental works. For the present there are few of them, but we are continuing this work.

The Presidium of the DVNTs is now pursuing a policy of organizing engineering-technical centers and consultation stations of sectorial specialization and of uniting the efforts of departmentally dissociated scientific collectives through the organization of scientific production associations. Good contacts have been established, for example, with four ministries: the USSR Ministry of Nonferrous Metallurgy, the RSFSR Ministries of Geology, the Gas Industry, and Higher and Secondary Specialized Education. But here, too, as they say, "friendship is fine as long as you don't ask for money." Therefore, we also have to nurse innovations on the meager academic budget. And locally people do not very willingly agree to allocate plots and equipment for pilot works. We would have liked to build "bridges" with organizations of the Ministry of the Fish Industry, but were not at all able to stir to action its Pacific subdivision, the Main Administration of the Fishing Industry of the Far Eastern Basin. Two years ago we offered them a new method of forecasting the Pacific saury catch--they rejected it, but the Main Administration of the Fishing Industry of the Northern Basin adopted it and is taking in big catches of capelin.

The scientific center has concluded more than 250 contracts on creative cooperation with scientific research organizations and VUZ's on a bilateral and multilateral basis. The range of activity on the coordination of research in the Far East is vast--there are 57 sectorial institutes, 27 VUZ's, and a state university located along the Pacific Ocean. There are an interdepartmental coordinating council and commissions. Common plans are being compiled. And yet the practical yield is still not large. The council is not persistent enough in monitoring its decisions and measures of administrative, economic, and legal influence.

By the way, we have also not yet completely put in order the coordination of research of our own institutes, although several steps have been taken to regulate the themes of the Institute of Marine Biology, the Pacific Ocean Geography Institute, the Pacific Institute of Bioorganic Chemistry, and the Chemistry Institute.

We complain about the poor material and technical base. Of course, it needs improvement. Production laboratory sections at some scientific subdivisions--the Computer Center, the Mining Institute, and the Institute of Economic Research (Khabarovsk)--have been in the "embryonic stage" for many years. But at the same time the available equipment at times is idle. A diver's system worth 6.5 million rubles sat needlessly for 3 years until it was transferred to the Institute of Biomedical Research. There is room for much improvement in the use of imported equipment and the research fleet.

The personnel turnover at the Far Eastern Scientific Center is high. During the five-year plan we hired 19 doctors of sciences, while 43 got their discharge. About 150 candidates of sciences arrived from various places, but 272 left. On the one hand, the institutes, which give little thought to attaching "homespun" young specialists, are to blame. On the other hand, of definite significance is the fact that the party and soviet organs in the Far

East are not sufficiently concerned about creating normal social and living conditions for the scientists. It is almost impossible for the young associate to get an apartment or to place a child in a nursery or kindergarten. The building of the campus has been slowed down drastically in recent years. All of this requires decisive and radical changes.

Reorganization and the new concept of the long-term development of the Far Eastern Region, of course, are also changing radically the research policy of the DVNTs.

The effectiveness of science is essentially determined by the level of basic research: the higher it is, the more promising, large-scale innovations are introduced. At all of the institutes proposals on the basic research directions have been prepared for approval by the departments of the USSR Academy of Sciences. Here we are attaching particular importance to the clearly defined scientific and technical orientation of research. In the plans on the development of the world ocean attention is given to the development and introduction of promising technologies and systems of the extraction and complete processing of its biological and mineral resources for obtaining food and fodders, as well as for the production of biologically active substances.

The region has deposits of nonferrous metals, silver, and other valuable elements and minerals. We are expanding our research on developing the theoretical principles for the comprehensive utilization of underground resources. Low-waste and waste-free technological processes, as well as processes for the intensive processing of various types of raw materials are so far being slowly introduced here. The degree of extraction of by-product components, whose value at some deposits of the region often exceeds the value of the basic components, is low. Science and practice confirm: precisely this method in the Far East will be several fold less expensive than the increase of the extraction of minerals and their processing by traditional methods. Even more effective are the measures on the elimination of losses and the more complete utilization of extracted and secondary raw materials. It is envisaged to perform work in this direction within the framework of the Intensification Scientific and Technical Goal Program.

The research being conducted today at the Far Eastern Scientific Center on the physiology, biochemistry, and immunology of plants, genetic engineering, tissue culture, and modern breeding with the purpose of solving the problems on protecting agricultural crops against diseases, pests, and weeds is as urgent as possible. Biological institutions are concentrating their attention on comprehensive studies of natural and artificial biocoenoses for the efficient utilization of soil, plant, and animal resources of dry land in forestry, agricultural, and hunting and on the study of ecology and the problems of reproduction and biological productivity of fauna and flora in the Far Eastern seas and adjacent water bodies of the Pacific Ocean.

The Far East Program has convinced us of the utility of the coordination of efforts--about 70 collectives worked on it. Scientists have become firmly convinced: when reorganizing their activity it is necessary to increase the quality and reliability of the recommendations on the long-range planning of

the region's socioeconomic development, the acceleration of scientific and technical progress, and the increase of production efficiency.

6289

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## PATENTS AND INVENTIONS

### DOCUMENTATION, EVALUATION, INTRODUCTION OF INVENTIONS

Moscow PRAVDA in Russian 22 Oct 86 p 2

[Article by V. Skomorokhov, general director of the Kation Production Association, and Candidate of Technical Sciences G. Gordiyenko, chief of the association's Special Design and Technological Bureau (Khmelnitskiy): "The Tripping Up of an Innovation. Accelerate Scientific and Technical Progress"; first paragraph is PRAVDA introduction]

[Text] The shortcomings in the organization of invention and the development of new equipment are widely known. However, the patent services at enterprises and organizations remain weak. The existing statute does not compel economic managers to strengthen them and to actively seek and introduce innovations. As a result the quality of applications for inventions decreases and prolonged correspondence with the USSR State Committee for Inventions and Discoveries arises. The shortcomings in the drawing up of design documentation are also well known: the long period of its output, numerous consultations, and a quality that is far from always high. There have been many complaints about the slow manufacture of prototypes.

Clearly, the situation must be improved. But how, exactly? In general terms one must expand more boldly enterprises' rights and independence, organize qualified patent services, increase the level of elaboration of design documentation, and improve material stimulation and the procedure of making prototypes.

An organization or enterprise, which submits an application for an invention that was developed in the course of carrying out an official assignment, obtains an inventor's certificate. The certificate does not grant the enterprise any rights and the enterprise has no objective interest in it. In our view, the matter should be set up in the following manner: permit the enterprise, that obtains and utilizes an inventor's certificate, to allocate a specific increased percent of the profit to the economic stimulation fund and to pay from this fund bonuses to the authors and persons who expedited its introduction. Then, the patent services will also become economically essential to the enterprise.

The difficulties that are impeding the compilation of technical specifications must be eliminated. The compendium of standards of the Unified System of

Design Documentation (YeSKD) requires that all stages of designing must be observed. Practice shows, however, that many stages can be combined or even omitted, thereby accelerating the issuance of specifications without reducing their quality. But even when the planners have completed technical specifications and a working model, they are obliged to observe purely formally, essentially in retrospect, all of the stages--the technical assignment, the conceptual design, and so on, without which the specifications will not be approved. Nevertheless, because it is expedient to consolidate operations, many scientific research institutes and design bureaus do so at their own risk and responsibility. It would seem that the opportunities to accelerate designing should find reflection in the documents of the YeSKD.

One should particularly look into the internal reasons for which scientific research institutes [NII] and design bureaus [KB] are reluctant to develop documentation for "someone else's" ideas. Here it is not only a matter of prestige considerations, but the roots also lie in the area of economic interests. The creation of something new and advanced is a matter of concern not merely to talented authors alone, but also to the collectives. Specialists and workers frequently fulfill increased production assignments for the authors of inventions and purchase unordered equipment, materials, and component parts. The authors receive a reward that amounts to 2 percent of the annual economic impact for a period of 5 years. But no incentive is given to the NII and KB collectives, which contributed labor to the compilation of the technical documentation of the introducing enterprise, which incurred expenditures on development and the additional consumption of centrally allocated materials and component parts. Just a few individuals receive a bonus for aiding the introduction of inventions. But does this not demean the role of the collectives as a whole, which in one way or another contributed to the acceleration of scientific and technical progress? Let us assume that the materials stimulation of the introduction of new equipment should be carried out primarily with allowance made for this role of theirs. Then there will be fewer people who are indifferent to the assimilation of scientific and technical achievement.

The principal product of the work of NII and KB collectives is high quality technical documentation for technology processes, equipment, machines, apparatus, instruments, materials, and other articles that yield a large national economic impact. It is therefore advisable to evaluate this documentation and determine its cost by the technical quality of developments and the economic impact from their practical realization. One should also consider the fact that the labor of personnel in pilot or else series production is included in the improvement of the documentation (corrections).

Inconsistency presently reigns when evaluating the cost of technical specifications. The point is that different systems are used to finance NII and KB projects: the state budget system, economic contracts, while some institutions are carried on the balance sheet of industrial associations and enterprises (belong to them). Frequently the documentation passes through a broad network of scientific and technical information centers. All of this predetermines the variable cost of documentation for innovation that may be introduced at enterprises. There are also forms of free documentation transfer for the introduction of innovations. In short, the cost of an

innovation for an industrial enterprise can be different and can be paid out of various funds, which is also quite significant. That is, the labor product of the NII and KB collectives--technical specifications--is not accurately evaluated.

Thus, when enterprises switch over to self-financing and full cost accounting, they will have a greater economic interest in borrowing innovation that in carrying out or introducing new "pioneer projects." This is also predetermined by the fact that according to the existing statute the enterprise, that has introduced an invention for the first time, incurs the most expenses for the development of the new one, for its operational development, for the manufacturing of a test batch, and for the payment of royalties, almost without replenishing its own funds. While the next ones to carry out introduction owing to the use of new equipment increase their own economic stimulation funds practically without incurring any additional expenses. There is not even "leveling" here, it is even worse: those who did less gain more and are awarded more bonuses. It is necessary to arrange things so that the expenses of the first to carry out introduction would be reimbursed to it through the sale of either domestic licenses or the technical specifications--at a higher price. And so that a significant portion of the assets in this case would go into economic stimulation funds of both the NII (or KB) and the enterprise which is the first to carry out introduction and that the bonuses to the authors would be paid from those funds. Such an approach, in our opinion, would help raise the prestige of the labor of both the developers (including the programmers) and the inventors.

The time has also come to establish order in the stimulation of the acceleration of scientific and technical progress. Let us take a case from practice. In a very short period of time, less than a year, we designed a highly productive automatic machine which in its characteristics greatly leads the analogs: by ten- to twelvefold in capacity, by eight- to tenfold in weight. The designers of the automatic machine were commended by a special order and bonuses of the ministry for the rapid completion of the work. To our surprise, approximately 1 year later the entire sum of this bonus was deducted from the bonus for new equipment. But the bonus for new equipment stimulates the creation and introduction of an innovation, but not the acceleration of this process. True, there was a reference in the statute that there would be a 25-percent increase in the bonus if the work is expedited, but neither time standards nor the scope or extent of introduction are indicated. Given the present interpretation introduction is reckoned according to the test batch, then the expansion of production takes place. In general, the efficacy of one measure or another on new machinery is evaluated by the calculation of the annual economic impact, and the time factor of introduction is simply absent. One should also group with the shortcomings of the existing method the fact that in case of the decrease of the labor-intensiveness and the freeing of people the socioeconomic impacts: the decrease of the payment for vacation certificates, medical certificates, and so on, are not taken into account in the calculations. But the underestimation of the effectiveness of work often leads to a situation where it is simply not carried out.

In our view, it is necessary to introduce time standards for the development, manufacture, and introduction of new machinery and to make the additions of funds and the sizes of bonuses dependent on adherence to these standards. If the time of the work is less than the standard, more is to be deducted for the funds and bonuses are to be increased; if the standards are not met, both the deductions and the bonuses are to be reduced. Such a progressive dependence on the time, scale, and extent of introduction should exist both for the developers (NII or KB) and for the introducing organization.

When the NII and KB really become masters of their own product--the technical specifications--and reinforce their material stimulation funds subject to their realization, the economic impact, and the level of developments, for the collective of developers not the presence of authors on their staff, but a truly high scientific and technical level of the innovation will become important.

Particularly large enterprises come into contact with innovations at the stage of the production and adjustment of prototypes. In all "production units" the plan is compiled for a year, or else 2 years, and component parts and materials are order for at least a year. Such time is the tripping up of the acceleration of scientific and technical progress. It is believed that the manufacture of prototypes involves the creation of NII and KB experimental bases. This is really extremely urgent. But such results can be achieved without capital investments, if maximum encouragement is given to enterprises to deliver component parts, materials, units, parts, instruments, and to manufacture prototypes for the NII and KB over and above the production plans. But on the condition that the profit received from this will all be channeled into the economic stimulation funds. In our view, this would improve the situation with the manufacture of prototypes, moreover, in the shortest possible time.

6289

CSO: 1814/52

## INTERNATIONAL S&T RELATIONS

### CEMA SCIENTIFIC, TECHNICAL INFORMATION SYSTEMS

Moscow PRAVDA in Russian 13 Oct 86 p 4

[Article by L. Chausov: "...Known in Comparison. Experience Is a Common Asset"]

[Text] "To reach the world level" is a phrase that is now heard everywhere. But what is it--the world level--in each specific type of industrial product? By exactly what means can it be attained and surpassed? In order to clarify this, one must have a rather clear idea of what we have and what all others have. Moreover, we must learn how to compare....

Important steps are now being taken in the national economy of the CEMA countries to increase the level and quality of equipment, technology, and materials. An indispensable condition here is the accuracy of evaluation.

An international seminar that recently took place in Moscow noted that the experience gained in information science is per se a valuable asset. Its theme--"Information Supply and Methods of Evaluating the Technical Level"--perhaps sounds rather dry, and even abstract to the uninitiated. However, behind it are the most vital, urgent problems that are being currently worked on by machine builders, metallurgists, and specialists of electrical engineering, radio electronics, and other most important branches, upon which scientific and technical progress depends.

This meeting was the first of its kind. It was organized by the International Center of Scientific and Technical Information and the Machine Science Institute imeni A.A. Blagonravov with the active participation of colleagues from Bulgaria, Hungary, and the CSSR.

The first developments and results of the introduction of methods for evaluating the technical level of products, including with the use of modern mathematical methods and computer technology, are already available in the socialist countries.

"The modern economy is facing each sector with the need to become more regularly and completely acquainted with what is new in the world," says Director of the Czechoslovak Center of Scientific, Technical, and Economic Information Jaroslav Kubik. "That is why we are planning to create a special

data bank within the national information system for the purpose of making international comparisons of the technical and economic levels of goods and production."

Thus, it is a question of data retrieval systems. What is that? Databases are created from the most diversified sources on our own and foreign producers, materials, machine systems, technologies.... Here it is necessary to formulate accurately the users' requirements. In addition, one needs to take into account the constant influx of new data. However, it would be silly to collect just any kind of information: only that information which is essential from the standpoint of the user, is needed. Otherwise this would be an "information barrage."

The special Korter method has been developed in the CSSR. It originated in machine building and precisely in this sector is being adopted by administrative organs. The Atest method is also being actively utilized in the chemical industry. The Czechoslovak experience attests that an information system should be solidly linked with the management mechanism and should be included in the decision-making process itself. Only then will it yield perceptible benefits to the national economy.

The time has come to formulate a general concept: how the questions of the information support of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to the Year 2000 are to be settled. In precisely what should efforts be united and how should the tasks be divided among the partners?

An important distinguishing feature of today's international market is the increase of the complexity of objects. It is no longer possible to give an off-the-cuff unequivocal answer to the question of whether it is possible to regard some item "a" better in any respect than item "b." For everything depends on the method of comparing the technical level of these commodities and their prices. Consideration must also be given to both the developmental trends of international markets and the level of the world production of similar items. Whatever one says, the task is not an easy one. But electronics is coming to the rescue. And the results of comparisons are allowing management personnel to locate reserves in production and in the commercial and economy activity of their own enterprises and to settle in a more qualified manner the questions connected with modernization and structural changes in products, particularly those oriented toward export.

The Bulgarian program system Biser makes it possible to draw just such conclusions. While the Hungarian Komporgan Association is exhibiting in Moscow its own development, the Rang-64, which is based on a minicomputer.

The principal problems are associated with the development of methods, as well as the organization of the acquisition and preparation of factual data.

These complex problems will be solved in the national information systems with the use of the potentials of the already operating international system of scientific and technical information.

In short, we must work properly in expanding information science in the name of the quality and reliability of new products.

6289

CSO: 1814/53

## REGIONAL ISSUES

### INEFFICIENCY OF KAZAKH ACADEMY OF SCIENCES INSTITUTES

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 21 Aug 86 p 2

[Article by PRAVDA correspondents T. Yesilbayev and A. Petrushov (Alma-Ata): "Not a Special Case. Effective Utilization for the Scientific Potential"]

[Text] "Especially great demands are made on the personality of the scientist who stands on the front line of scientific and technical progress. But in some research collectives, particularly in ours, narrow-mindedness and self-seeking flourish under the guise of 'activity'."

These are lines from a letter by E. Malenko, a senior scientific associate at the Institute of Petroleum and Natural Salts Chemistry of the Kazakh SSR Academy of Sciences (city of Guryev). The facts that he cited were confirmed. As a result, Academician of the Kazakh SSR Academy of Sciences N. Nadirov was relieved of his position as chief scientific secretary of the republic academy (until recently he was also director of this institute). This is the very same N. Nadirov, who from time to time was described in all the booklets as a "recognized leader of the school of Kazakh petroleum chemists, one of the country's leading petroleum chemists" and as a person of "extraordinary qualities."

For many years he simultaneously held positions in various cities. From Alma-Ata, thousands of kilometers away, this "extraordinary" person managed the collective of the institute in Guryev. This was done mainly by telephone and short-term "forays." N. Nadirov resigned 2 years ago as director. However, the phone calls and voyages to the Ural shores continued: he retained for himself the overall supervision of the scientific and scientific organizational activity of the institute. Moreover, in defiance of the existing statute he remained chairman of the scientific council. While the new director, M. Diarov obediently carried out the instructions from the Zailiyskiy Alatau mountains, which concerned personnel selection, recertification, and the payment of bonuses. As before, unplanned research was encouraged. The petrochemical scientists invented microphones, ichthyological traps, spark plugs....

By the way, the appearance of concern about basic science was also created. When the presidium of the academy relieved N. Nadirov of his duties as director, the decree noted that in the last 8 years the institute introduced

42 scientific developments, having derived an enormous national economic effect. For his solid alliance with practice the "leading petrochemist" became an academician of the Kazakh SSR Academy of Sciences.

It is not difficult to image in the feelings of E. Malenko and his colleagues, who knew well the true state of affairs at the institute. But they did lose faith in justice. Organs of the People's Control studied the work of the institute. The grossest violations of the procedure of calculating the economic effectiveness of scientific developments were revealed. The fictitious impact here came to almost 100 million rubles during the 11th Five-Year Plan alone. The actual return per ruble spent corresponded to 20 kopecks instead of 21 rubles according to the reports.

When we became acquainted with the "Guryev affair," we were led to understand at the Science and Educational Institutions Department of the Kazakh CP Central Committee that this was a special case which, in addition, was properly assessed: N. Nadirov was removed. But he was relieved in accordance with the submitted claim. Now, in the capital of the republic they are concerned about providing him with a position, just as, by the way, a number of other persons who have compromised themselves. As regards to the case itself, it is far from special. Take the academy's Institute of Metallurgy and Ore Dressing. "Errors" were also made there in estimating economic effectiveness, to the tune of 38 million rubles. At the Institute of Nuclear Physics the "fake" impact turned out to be in the range of 17 million rubles.

Some of the scientists voiced the fear that the unfavorable incidents reported in the press would adversely affect the reputation of Kazakh science. More likely, on the contrary, the removal of self-centered self-seekers and deadwood will raise the academy's prestige and give encouragement to honest workers. This was demonstrated by the annual assembly itself, at which a self-critical, profound analysis was offered by the new President of the Kazakh SSR Academy of Sciences and Lenin Prize winner M. Aytkhozhin. Participants applauded the criticism of the worthless work of individual scientists and collectives.

Kazakh science has something to be proud of. Today, for example, it is impossible to imagine the development of the ore base and the retooling of the mining enterprises without the introduction of developments of the Mining Institute of the Kazakh SSR Academy of Sciences. The research geologists helped to significantly reduce the amount of exploratory and prospecting operations and to discover new large mineral deposits. Technologies, which ensure the complete use of mineral resources and waste products, have been developed for nonferrous metallurgy. The scientific works of mathematicians, physicists, and biochemists have won recognition. But many of these things are quite old services.

During the past five-year plan not a single license agreement on developments of Kazakh scientists was concluded. What does that signify? A low quality of the scientific product. A lack of fresh, original ideas, significant approaches, and genuine innovativeness. And where are they to get them, if the academy and its many institutes have been working in directions that were outlined 40 years ago? It is no accident that academy institutions stood

aloof of the problems of interbranch scientific technical complexes being organized in the country, and that not one of them became the main one in the union programs. The yield from scientific institutions markedly fell. When they looked into the "fake" impacts, it turned out that many introduced results of development were eyewash. Most of the institutes do not have close contact with enterprises.

We had occasion to discuss the reasons behind the formed situation with many scientists and specialists. Most were convinced that to increase the effectiveness of scientific research it is necessary to change over to the intensive means of development, which the former management of the academy was unable to do. The questions of the organization of scientific work, the interaction of the academic, industrial, and VUZ sectors of science, and the strengthening of contact with production were neglected. Practically no academic institute is capable of rapidly transforming a promising idea into a pilot plant or a new technology, inasmuch as the overwhelming majority do not have a design and experimental base.

At the same time, as the scientists believe, the level of Kazakh science is now already sufficient to solve many regional problems on its own. However, such opportunities are as yet being poorly used: the proper organization, discipline, and at times, a lack of conscientiousness and an honest approach to the assigned task are lacking.

It is known, for example, that the reliability and level of scientific results largely depend on the technical equipment which scientists have. The latest instruments and other devices are being sought. They were also sought at the Kazakh Academy of Sciences. And what was the result? Expensive scientific equipment has gone unused at a number of academic institutes for years. Thus, a semifinished glass block for a telescope has been sitting in its factory crate for 20 years at the Astrophysics Institute. An imported measuring device and computer are sitting idle. There are 255 units of equipment standing idle in the subdivisions of the Physical and Mathematical Sciences Department. Moreover, almost half of it is now obsolete without having given science a grain of benefit. A similar situation can be seen at the Institute of Chemical Sciences and others.

The formation of scientific personnel in the republic is a special subject. There are presently more than 10,000 scientific associates at the academic institutions. But there is still no genuine concern about the training of young scientists. The average age of the Kazakh doctors of sciences is 59 years. And this could not but affect the effectiveness of research.

Back in 1981 the decree of the Presidium of the USSR Academy of Sciences on improving the work with young people was adopted. Has anything changed since that time within the republic Academy of Sciences? No, nothing has. A council of young scientists was organized, but it has been "stewing in its own juice." Some 700 young associates are in dire need of improved housing conditions. The training of graduate students is cause for alarm. It has become the rule that in the pursuit of material gain and to the detriment of the matter at hand some doctors of sciences take too many wards under their wing. Thus, Director of the Economic Institute T. Ashimbayev has taken care

of 16 graduate students in recent years, but only 3 have defended their dissertations.

Finally, there is one more "grave legacy" that befell the new academy leadership. We mean the moral climate in the research collectives. In the last 5 years the Alma-Ata PRAVDA correspondence station has received complaints from almost all of the scientific institutions. In some institutes months and years have been wasted on squabbles. Checks of the letters indicate that cases of abuse of official position, nepotism, and regional cronyism in the selection and assignment of personnel, and suppression of criticism were the basis for the complaints. Illustrative in this is the Institute of Literature and Arts imeni M. Auezov. How did the institute's former director select personnel? A certain S. Kairkanov with a seventh-grade education became here the deputy director for general affairs. During the period of his employment at the institute this good-for-nothing director ended up in a sobering up station three times, but he was awarded substantial bonuses.

An abnormal creative atmosphere also evolved in several institutions of the Eastern Department of the VASKHNIL [All-Union Academy of Agricultural Science imeni Lenin]. The Scientific Research Institute of Pasture Land Management has been running a fever for several years. Its director Zh. Zhambakin falsified data in his doctoral dissertation. For that the Presidium of the USSR High Certification Commission denied him the doctoral degree without the right to a second defense. The self-besmirched director was relieved of his duties "in connection with his transfer to another position." To which position? He remained at the institute as a department head, as well as...scientific supervisor for graduate students who are candidates for scientific degrees. A so-so mentor of young people!

Now that new persons have assumed the leadership of the Kazakh SSR Academy of Sciences, a reevaluation is being made of the former views on many aspects of scientific work. All links, from the laboratory to the academy presidium, are in need of reorganization. But so far this process has been proceeding slowly, particularly in the institutes. Letters to PRAVDA indicate that initiative often runs up against a wall of indifference, or else against open resistance to the new demands. This merits the serious attention of not only the presidiums of the academy and the Eastern Department of the VASKHNIL and their party organizations.

6289

CSO: 1814/52

## CONFERENCES AND EXPOSITIONS

### ROLE OF SOCIAL SCIENTISTS IN SOCIOECONOMIC DEVELOPMENT

Kiev PRAVDA UKRAINY in Russian 11 Sep 86 p 3

[Article (RATAU): "Strengthen the Bond Between Science and Everyday Life"]

[Text] Responsible tasks were set for social scientists by the 27th party congress. They must take into account the specific needs of everyday practice, react sensitively to the ongoing changes in life, keep new phenomena in view, and draw conclusions that can properly orient practice. The questions of the organization and coordination of social science research in the light of the decisions of the 27th CPSU Congress were discussed at the joint session of the Social Sciences Section of the Presidium of the USSR Academy of Sciences and the Social Sciences Section of the Ukrainian SSR Academy of Sciences, which was held in Kiev on 9-10 September. Social scientists from the Belorussian and Moldavian Academies of Sciences also participated in it.

President of the Ukrainian SSR Academy of Sciences Academician B.Ye. Paton opened the session.

Introductory remarks were made by Vice President of the USSR Academy of Sciences P.N. Fedoseyev. The tasks posed by the party congress of the acceleration of the country's socioeconomic development and the improvement in all aspects of public life, he noted, are now at the center of attention of social scientists. The scientists' efforts have been directed toward the restructuring and activization of research, the further development and intensification of the work on new social science problems, and the assurance of a decisive turn of scientific research towards practical needs. This will be facilitated by the joint efforts of the Presidiums of the USSR and UkSSR Academies of Sciences. As a result of the coordination of research the principal functions of base centers, main scientific institutions, and scientific councils will be specified more clearly.

By what means and in what directions and forms the development of socialist society will take place, and to what new frontiers and higher stages it has to be raised, how the alignment of the material and spiritual forces of the two social systems in global competition will change, and how to avoid a military confrontation--such are the main questions which life is posing for scientific

thought. All social scientists must devote considerable attention to their elaboration.

Academicians I.I. Lukinov and A.G. Aganbegyan presented papers at the session.

In the reports and addresses it was noted that in the period since the 27th CPSU Congress academic scientific institutions have critically examined the results of their work, have outlined priority measures on improving it, and have specified research plans. Proposals have been prepared on improving the economic mechanism and management, the methods of appraising the effectiveness of new technology and economic measures have been modified, and closer contact is being established with Gosplan, ministries, and departments of the country. However, it was pointed out at the session, only the first steps have been taken. As a whole, the reorganization is lagging behind life's requirements both on the theoretical level and in organizational forms. The realization of the program set forth by the party of society's accelerated socioeconomic development requires of scientists fundamental theoretical generalizations, ideas, which are of a research nature, and discussions and debates on problems of philosophy, political economy, the theory of scientific communism, and other social sciences.

Great importance, the participants of the session emphasized, must be given to the concentration of the scientific potential on the assurance of the comprehensive solution of major problems of national importance, which eliminate the splintering of forces and resources and work on topics of minor importance. In this connection sociological research should be expanded, the socioeconomic and moral-political foundations of the socialist way of life should be studied, and an aggressive battle should be waged against contemporary versions of philistinism and aspirituality, parasitism and consumerism, and there should be active participation in the work on the communist education of the workers.

The session participants devoted considerable attention to problems related to the restructuring of the economy and the improvement of the economic mechanism and management. Their solution requires the more thorough development of economic theory and an analysis of product forces and production relations. Studies on these and other urgent problems should be carried out on the basis of the generalization of economic practice and should serve the acceleration of scientific and technical progress, the increase of the efficiency of the economy, and the utilization of all production reserves. Scientific institutions are obliged to participate actively in the solution of problems of the changeover of enterprises and associations to genuine cost accounting, self-sufficiency, and self-financing and the creation of modern organizational management structures with allowance made for the tendencies toward production concentration, specialization, and cooperation.

It was said at the session that the research of social scientists needs to be directed toward the elaboration of a general theoretical concept of the modern era and scientific principles for forecasting global development and the new type of international relations. Also requiring thorough analysis are the processes that are taking place in the communist, workers', and national liberation movement.

A significant part of the session was devoted to the problems of the training and retraining of scientific personnel and their on-the-job training at leading institutes of the USSR Academy of Sciences.

Recommendations aimed at improving the organization and coordination of joint research in the social sciences and strengthening its contact with life were adopted at the session.

Candidate Member of the Politburo and Secretary of the Ukrainian CP Central Committee V.A. Ivashko, Deputy Chief of the CPSU Central Committee Science and Educational Institutions Department V.V. Ryabov, and Chief of the Ukrainian CP Central Committee Science and Educational Institutions Department F.M. Rudich took part in the work of the session.

6289

CSO: 1814/52

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